Just for your Tandy Color Computer 1, 2 and 3

October 1988

Canada $4.95 U.S. $3.95

The RAINBOW®

THE COLOR COMPUTER MONTHLY MAGAZINE

Graphics View Masters

Jeremy Spiller

Manipulating PMODE Graphics Images — shrink 'em, stretch 'em, turn 'em upside down and inside out

Patrick D. Grengs II

Creating Whirlpools and Waves in an Undulating Grid

Ru Cutchin

Br Four-Color Barrier

Er

R CoCo 3's HPRINT C et

A charge Your Keyboard; D odman Cures C kdies,' the FD 500/502 Drives a Pak Interface; F S-9 Files and MORE!

SUB 38538 EXP 8909 RBDW10/88
HARRY N HARMON
1404 VILLAGE AVE
LOVELAND CO 80538

0 44254 00001 10

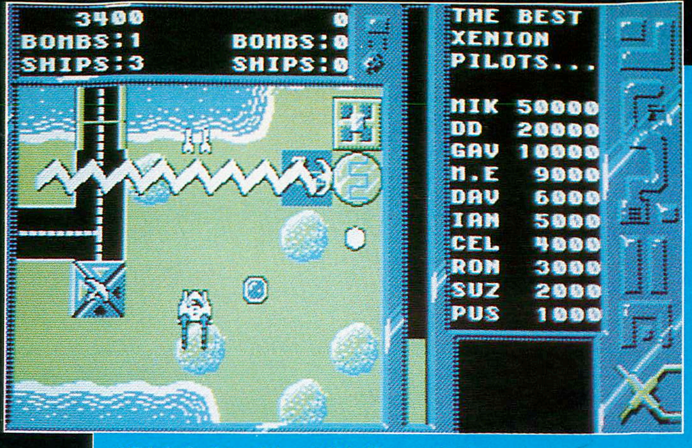
DIECOM PRODUCTS INC.

XENION:

Pilot your Xenion XE-II fighter over hostile enemy planets in order to rid the galaxy of evil. Hordes of alien attack ships will try to stop you in the air. Watch out for cyclops cannons and tanks which will fire at you from the ground. And beware, mother ships will appear and try to finish you off. You can pick up smart bombs from the planet and use them in your fight against the enemy. Dozens of screens of detailed terrain make this a great game for everyone.

64 k CoCo 1 or 2 and joystick required. Tape or Disk.

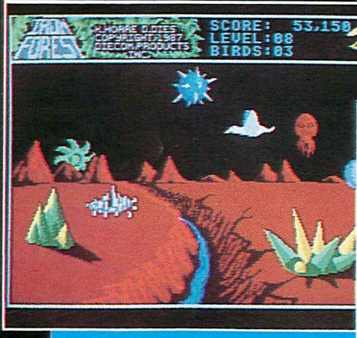
$29.95 U.S.
$37.95 Can.


3400
BOMBS:1
SHIPS:3
0
BOMBS:0
SHIPS:0
THE BEST
XENION
PILOTS...
MIK 50000
DD 20000
GAV 10000
M.E 9000
DAV 6000
IAN 5000
CEL 4000
RON 3000
SUZ 2000
PUS 1000

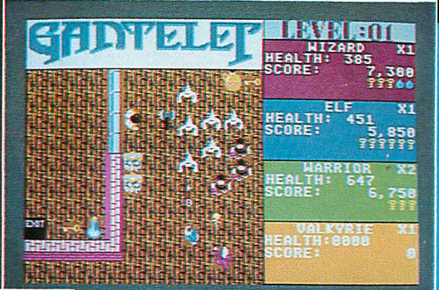
128 k CoCo 3 joystick and disk drive required.

- Prices subject to change without notice.
- No refunds or exchanges permitted due to the nature of the product.

(Disk Only) Game, Phaser & Interface
$29.95 U.S. $74.95 U.S.
$37.95 Can. $93.95 Can.

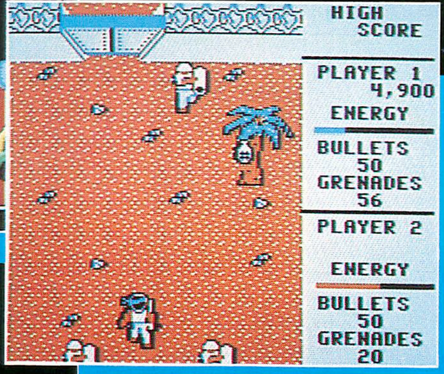

IRON FOREST
SCORE: 53,150
LEVEL: 08
BIRDS: 03

IRON FOREST – CoCo 3


GANTELET
LEVEL: 01
WIZARD X1
HEALTH: 385
SCORE: 7,300
ELF X1
HEALTH: 451
SCORE: 5,850
WARRIOR X2
HEALTH: 647
SCORE: 6,750
VALKYRIE X1
HEALTH: 0000
SCORE: 0

GANTELET II – CoCo 3 Disk Only.

$29.95 U.S. - $37.95 Can.


HIGH SCORE
PLAYER 1
4,900
ENERGY
BULLETS 50
GRENADES 56
PLAYER 2
ENERGY
BULLETS 50
GRENADES 20

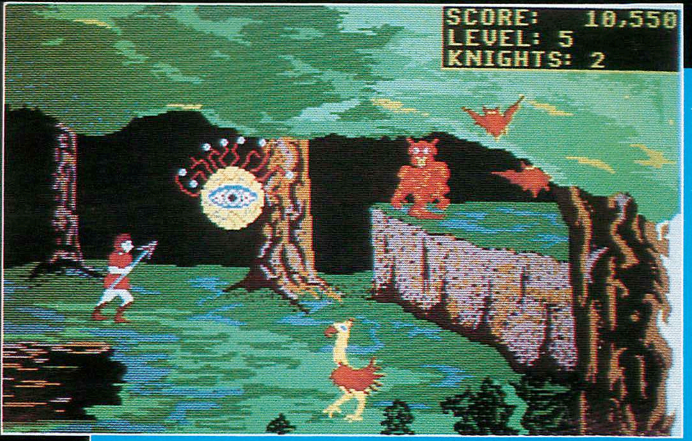
RUSH'N ASSAULT – CoCo 1, 2 or 3

(Tape or Disk)
$29.95 U.S. -
$37.95 Can.

MEDIEVAL MADNESS:

You have been asked by the King of a mysterious land to rescue his daughter, the fair Princess, from the clutches of an unknown evil! Armed only with your crossbow, you set out into the unknown land on your quest. As you enter the mysterious land you find yourself surrounded by swarms of odd creatures that inhabit the land. You take aim, and fire. A direct hit. The monster slowly fades away, leading you to believe something magical controlled the hideous creature. You press forward not knowing what will appear next. MEDIEVAL MADNESS, our second light phaser game has many detailed playing screens and loads of monsters to keep you playing for hours. Multiple skill levels increase the difficulty of the game and make it fun for the beginner or advanced player. Can you rescue the princess? Only time will tell!

Medieval Madness	Game, Phaser & Interface
$29.95 U.S.	**$74.95 U.S.**
$37.95 Can.	**$93.95 Can.**


SCORE: 10,550
LEVEL: 5
KNIGHTS: 2

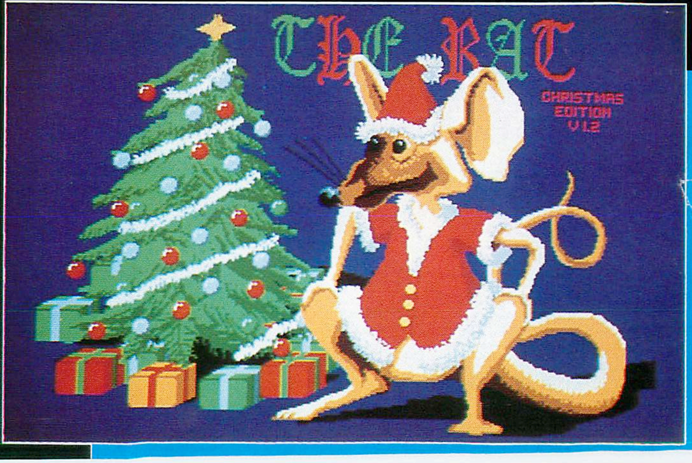
128 k CoCo 3 and disk drive required.

THE RAT GRAPHIC DESIGN PACKAGE:

This is the most complete graphics design package currently available for the CoCo 3. It supports 320 x 200 hi-res graphics mode with a 16 colour user definable palette. You can draw lines, circles, ovals, boxes, polygons and many more standard drawing functions. You can get stamps from the screen which can then be enlarged, shrunk, rotated, inverted and flipped and then be redisplayed on the screen in various ways. You can paint areas of the screen in one of the pre-defined colour textures or define your own custom textures. You can label your pictures with one of the pre-defined fonts or define your own custom lettering style. Now don't worry about trying to draw your picture with the keyboard or even a cumbersome joystick, 'THE RAT' comes with its own MOUSE. Yes that's right, it comes with a MOUSE, and not a simple analog one button mouse. Ours is a high quality digital, two button mouse like you would find on a more expensive computer like the Tandy 1000. You don't have to worry about selection squares around your drawing screen, just push a button on the mouse and you flip to a separate screen to select your drawing mode. Or you can use one of our pull down menus to load and save your pictures on disk. We also include screen print routines for many of the most popular printers.

Now that's a GRAPHIC DESIGN PACKAGE that beats them all! That's right, you get the graphics program, screen print routines, the mouse and the mouse pad all for one low price of:

$79.95 U.S. $99.95 Can.


THE RAT
CHRISTMAS EDITION V1.2

ALSO AVAILABLE:
GRAND PRIX CHALLENGE, GATES OF DELIRIUM, WRESTLE MANIAC, GANTELET, CALADURIL FLAME OF LIGHT, LANSFORD MANSION, MARBLE MAZE, KNOCK OUT, BOUNCING BOULDERS, PAPER ROUTE, F-16 ASSAULT, KARATE, GOLD RUNNER II.
UNIT PRICE: $29.95 U.S. - $37.95 Can.

DIECOM PRODUCTS INC.

6715 FIFTH LINE, MILTON, ONT., CANADA L9T 2X8

We accept:
VISA MasterCard
cheque or money order

24 hr. order line:
(416) 878-8358
personal service 9-5
E.S.T.

Please add $2 for shipping and handling (add $5 each for The Rat and all Light Phaser Packages). Ontario residents add 8% sales tax. Looking for new software.

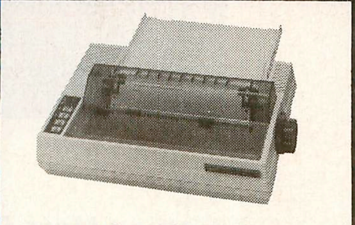
From Computer Plus to YOU . . .

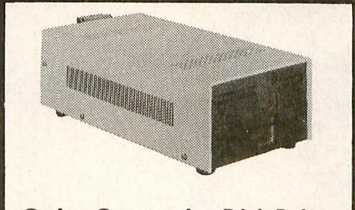
PLUS after PLUS after PLUS

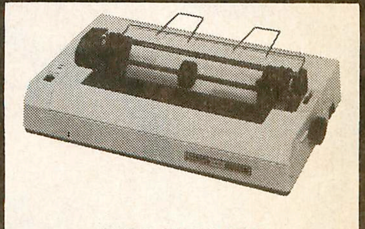
Tandy 1400 LT $1329
Tandy 102 32K $439
Tandy 200 24K $429

Color Computer 3
w/128K Ext. Basic $159

Tandy 1000 SL $689
Tandy 1000 TL $969


DMP-132 $289


Color Computer Disk Drive
Drive 0 $249 Drive 1 $149


DMP-106 $169

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS

Tandy 1000 HX 1 Drive 256K	439.00*
Tandy 1000 TX 1 Drive 640K	889.00
Tandy 3000 NL 1 Drive 512K	1279.00
Tandy 4000 1 Drive 1 Meg.Ram	1959.00
Tandy 5000 MC 2 Meg. Ram	3799.00

PRINTERS

Radio Shack DMP-106 80 CPS	169.00
Radio Shack DMP-132 120 CPS	289.00
Radio Shack DMP-440 300 CPS	549.00
Radio Shack DWP-230 Daisy Wh.	269.00*
Tandy LP-1000 Laser Printer	1899.00
Star Micronics NX-1000 144 CPS	199.00
Star Micronics NX-1000 Rainbow	269.00
Panasonic P-1080i 144 CPS	199.00
Panasonic P-1091i 194 CPS	249.00
Panasonic P-1092i 240 CPS	339.00
Okidata 320 300 CPS	369.00
Okidata 390 270 CPS 24 Wire Hd	515.00
NEC Pinwriter P-2200 170 CPS	399.00

MODEMS

Radio Shack DCM-6	52.00
Radio Shack DCM-7	85.00
Practical Peripheral 2400 Baud	229.00
Practical Peripheral 1200 Baud	149.00

COLOR COMPUTER MISC.

Radio Shack Drive Controller	99.00
Extended Basic Rom Kit (28 pin)	14.95
64K Ram Upgrade Kit (2 or 8 chip)	39.00
Radio Shack Deluxe Keyboard Kit	24.95
HI-RES Joystick Interface	8.95
Color Computer Deluxe Mouse	44.00
Multi Pak Pal Chip for COCO 3	14.95
PBH Converter with 64K Buffer	119.00
Serial to Parallel Converter	59.95
Radio Shack Deluxe Joystick	26.95
Magnavox 8515 RGB Monitor	329.00
Magnavox Green or Amber Mon.	99.00
Radio Shack CM-8 RGB Monitor	249.00
Radio Shack VM-4 Green Monitor	99.00
PBJ 0K COCO 3 Upgrade Board	19.95
PBJ 512K COCO 3 Upgrade	139.00
Tandy 0K COCO 3 Upgrade Board	24.95
Tandy 512K COCO 3 Upgrade	149.00

COLOR COMPUTER SOFTWARE

	TAPE	DISK
The Wild West (CoCo3)		25.95
Worlds Of Flight	34.95	34.95
Mustang P-51 Flight Simul.	34.95	34.95
COCO Util II by Mark Data		39.95
COCO Max III by Colorware		79.95
AutoTerm by PXE Comput.	29.95	39.95
TW-80 by Spectrum (CoCo3)		39.95
TeleWriter 64	49.95	59.95
TeleWriter 128		79.95
Elite Word 80		79.95
Elite Calc 3.0		69.95
CoCo 3 512K Ram Disk-CerComp		19.95
Home Publisher by Tandy (CoCo3)		35.95
Sub Battle Sim. by Epyx (CoCo3)		26.95
Thexder by Sierra (CoCo3)		22.45
Kings Quest III by Sierra (CoCo3)		31.45
Flight Sim.II by SubLogic (CoCo3)		31.45
OS-9 Level II by Tandy		71.95
OS-9 Development System		89.95
Multi-View by Tandy		44.95
VIP Writer (disk only)		69.95
VIP Integrated Library *(disk)*		149.95

***Sale prices through 10/31/88**

Prices are subject to change without notice. Please call for shipping charges. Prices in our retail store may be higher. Send for complete catalog.

CALL TOLL FREE
1-800-343-8124

- *LOWEST POSSIBLE PRICES*
- *BEST POSSIBLE WARRANTY*
- *KNOWLEDGEABLE SALES STAFF*
- *TIMELY DELIVERY*
- *SHOPPING CONVENIENCE*

VISA AMERICAN EXPRESS MasterCard

computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

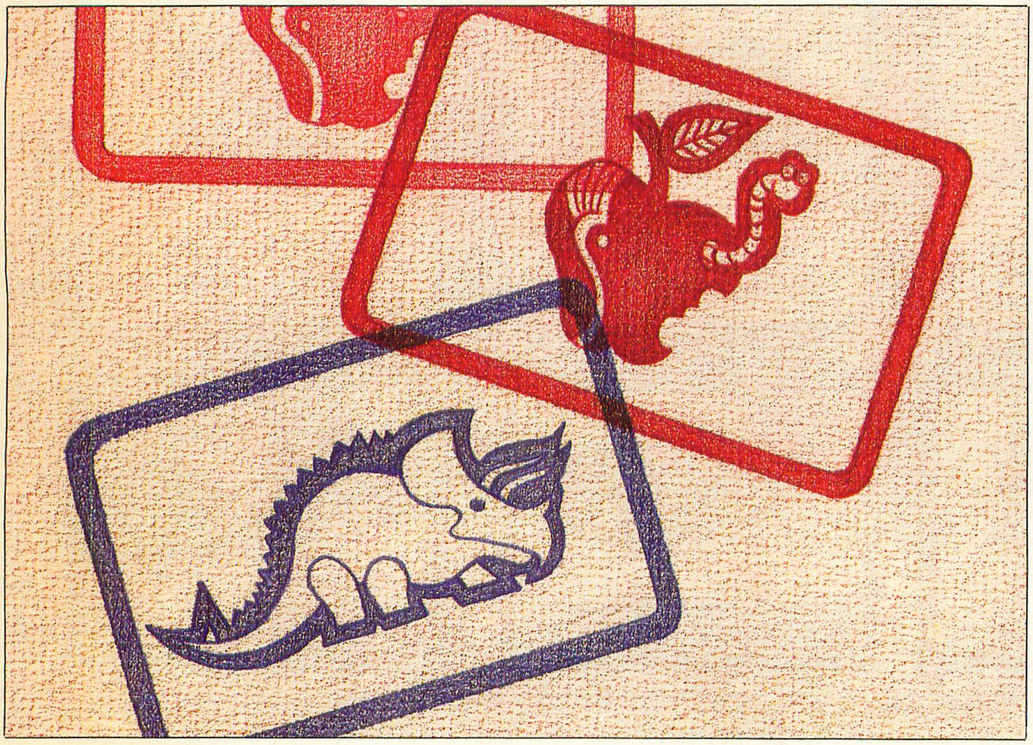
IN MASSACHUSETTS CALL (508) 486-3193

TRS-80 is a registered trademark of Tandy Corp.

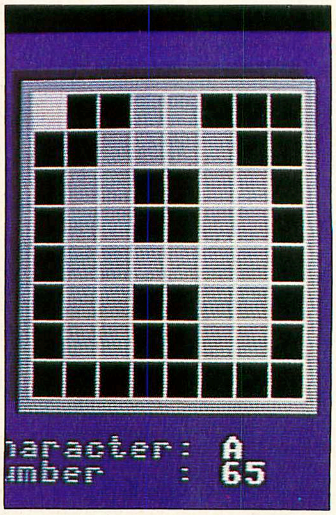
RAINBOW

Table of Contents

October 1988
Vol. VIII No. 3



28



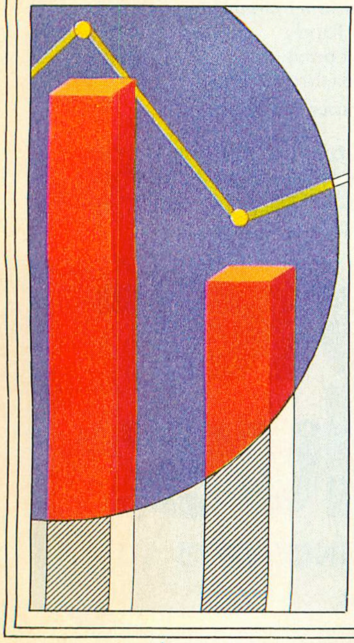
```
haracter: A
umber    : 65
```

41

Features

14
Bills! Bills! Bills!
David Turner
Organize household expenses in a fair, precise manner

51



28
Super Stamper: The Elastic Rubber Graphics Stamp
Jeremy Spiller
Two new graphics commands for PMODE image manipulation

41
The Font Master
Eric Wolf
Replace CoCo 3's built-in HPRINT font

48
Getting Graphic
William P. Nee
Part IV: Machine Language Made BASIC

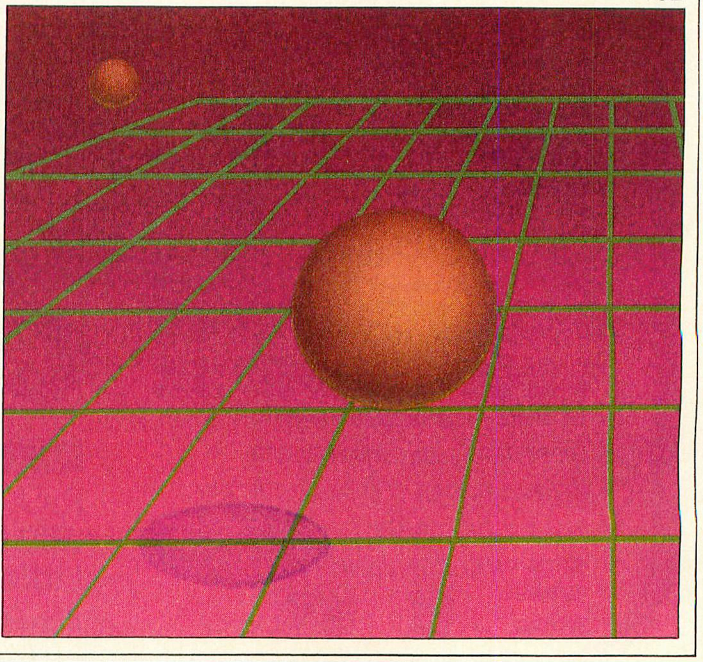
51
Breaking the Four-Color Barrier
Rusty Cutchin
Add many more than four colors in HSCREEN4

58
Quick Fixes
Marty Goodman
Three do-it-yourself fixes for the hardware hacker

72
Getting More Power From Your CoCo Keyboard
Michael Sweet
Make your keyboard perform like the big boys — and more

102
Warped Animation
Patrick D. Grengs II
Create whirlpools and waves in an undulating grid

102



Novices Niche

86
Fright Night
Patricia Moos

87
Ad Infinitum
Rick Weshenflder

87
Typing Up DRAW Strings
Keiran Kenny

88
Seeing the Bigger Picture
Erich Sweaney

88
Taking on the One-Armed Bandit
Kenneth Carlin

The cassette tape/disk symbols beside features and columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE. For details, check the RAINBOW ON TAPE and RAINBOW ON DISK ad on Page 126.

Departments

Advertisers Index ______ 160
Back Issue Info ______ 93
CoCo Cat ______ 104
CoCo Gallery ______ 26
Corrections ______ 84
Hints ______ 83
Letters to Rainbow ______ 6
Maxwell Mouse ______ 36
One-Liners ______ 54, 134
Racksellers ______ 158
Received & Certified ______ 130
Scoreboard ______ 106
Scoreboard Pointers ______ 108
Submitting Material to Rainbow ______ 154
Subscription Info ______ 155

Columns

98
BASIC Training
Joseph Kolar
New directions

56
CoCo Consultations
Marty Goodman
Just what the doctor ordered

64
Delphi Bureau
Cray Augsburg
Time for a change and Hutchison's database report

40
Doctor ASCII
Richard Esposito
The question fixer

10
PRINT#-2,
Lawrence C. Falk
Editor's notes

90
Wishing Well
Fred Scerbo
Two for the price of one

"BASICally Speaking," "Education Notes" and "Turn of the Screw" will return next month.

Rainbowtech

143
Accessible Applications
Richard A. White
Introducing the OS-9 Team

132
Barden's Buffer
William Barden, Jr.
Assembly language for the complete novice: Part II

147
KISSable OS-9
Dale L. Puckett
Another cry for standards

Product Reviews

AI-Write/*Daniel Jimenez* ______ 117
BASIC Screen Editor/*Second City Software* ______ 116
Disk Manager Tree/*Alpha Software Technologies* ______ 115
HELLO/BAS/*R.C. Pierce Software* ______ 125
Home Bingo/*Williams Enterprises* ______ 129
Inventory Manager/*Forrest Enterprises* ______ 113
Moon Runner/*Nick Bradbury* ______ 112
Night of the Living Dead/*Adventure Novel Software* ______ 110
Quest for the Ring/*RTB Software* ______ 128
Shadow World/*Prodek* ______ 116
Word Power 3.1/*Microcom Software* ______ 120

THE RAINBOW is published every month of the year by FALSOFT, Inc., The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059, phone (502) 228-4492. **THE RAINBOW**, **RAINBOWfest** and **THE RAINBOW** and **RAINBOWfest** logotypes are registered ® trademarks of FALSOFT, Inc. • Second class postage paid Prospect, KY and additional offices. USPS N. 705-050 (ISSN No. 0746-4797). POSTMASTER: Send address changes to **THE RAINBOW**, P.O. Box 385, Prospect, KY 40059. Authorized as second class postage paid from Hamilton, Ontario by Canada Post, Ottawa, Ontario, Canada.
• Entire contents copyright © by FALSOFT, Inc., 1988. **THE RAINBOW** is intended for the private use and pleasure of its subscribers and purchasers and reproduction by any means is prohibited. Use of information herein is for the single end use of purchasers and any other use is expressly prohibited. All programs herein are distributed in an "as is" basis, without warranty of any kind whatsoever. • Tandy, Color BASIC, Extended Color BASIC and Program Pak are registered ® trademarks of the Tandy Corp.
• Subscriptions to **THE RAINBOW** are $31 per year in the United States. Canadian rates are U.S. $38. Surface mail to other countries is U.S. $68, air mail U.S. $103. All subscriptions begin with next available issue. • Limited back issues are available. Please see notice for issues that are in print and their costs. Payment accepted by VISA, MasterCard, American Express, cash, check or money order in U.S. currency only. Full refund after mailing of one issue. A refund of 10/12ths the subscription amount after two issues are mailed. No refund after mailing of three or more magazines.

The Rainbow

Editor and Publisher
Lawrence C. Falk
Managing Editor Jutta Kapfhammer
Associate Editor Sue Fomby
Reviews Editor Lauren Willoughby
Submissions Editor Angela Kapfhammer
Copy Editor Beth Haendiges
Technical Editors Cray Augsburg, Ed Ellers
Technical Assistant David Horrar
Editorial Assistants Wendy Falk Barsky, Sue H. Evans
Contributing Editors
William Barden, Jr., Bill Bernico
Steve Blyn, Tony DiStefano,
Richard Esposito,
Martin Goodman, M.D.,
Joseph Kolar, Dale Puckett,
Fred Scerbo, Richard White
Art Director Heidi Maxedon
Designers Sharon Adams, Denise Webb
Typesetter Renee Hutchins

Falsoft, Inc.

President Lawrence C. Falk
General Manager Bonnie Frowenfeld
Asst. General Mgr. for Finance Donna Shuck
Admin. Asst. to the Publisher Sarah Levin
Editorial Director John Crawley
Asst. Editorial Director Judi Hutchinson
Senior Editor T. Kevin Nickols
Director of Production Jim Cleveland
Chief Bookkeeper Diane Moore
Dealer Accounts Judy Quashnock
Asst. General Manager For Administration Sandy Apple
Word Processor Manager Patricia Eaton
Customer Service Manager Beverly Bearden
Customer Service Representative Carolyn Fenwick
Development Coordinator Ira Barsky
Chief of Printing Services Melba Smith
Dispatch Tony Olive
Business Assistants Dawn Cecil, Laurie Falk
Chief of Building Security and Maintenance Jessie Brooks
Advertising Coordinator Doris Taylor
Advertising Representatives Belinda Kirby, Kim Vincent
Advertising Assistant Debbie Baxter
(502) 228-4492

For RAINBOW Advertising and Marketing Office Information, see Page 160

Cover photograph copyright © 1988 by John Beckman

Art direction by Heidi Maxedon

Letters to the RAINBOW

BACK TALK

Editor:

I would like to comment on two articles in your June '88 issue: David Huag's article, "Internal Sound," Page 99, and Michael F. Wiens' article, "CoCo 3 Potpourri," Page 158. David's article, which describes how to install a speaker and amplifier inside a CoCo to produce sound with monitors that lack this capacity, is flawed in several respects.

First, David suggested using a 9-volt battery as the amplifier's power supply. Such extra power would be expensive. Instead, the correct way to power such an amplifier is off the CoCo's own power supply. For CoCo 1s and 2s, a +10-volt source is available at the positive side of the power supply circuit's 10,000 mfd filter capacitor. The big filter capacitor is a black or gray cylindrical object about 2 inches long and one-half inch in diameter, which is marked with its value (10,000 mfd or 4,700 mfd). The positive and negative sides are indicated by a marking and arrow. CoCo 3s have a convenient +10-volt source at the junction of the cathodes of the power supply's two biggest diodes. The diodes are black, cylindrical objects, one-half inch in diameter and one-half inch long, which are marked with a single silver band on the cathode side of the diode.

Second, David recommended making your own amplifier from "scratch" with an LM 386 chip. While his circuit will probably work, why go to all the trouble? Radio Shack sells a speaker amplifier in a nice little package (Cat. No. 277-1008), which only costs $12 and has everything you need to install sound in your CoCo. It fits beneath the keyboard if you remove its back plate, and the Radio Shack's speaker has been baffled to provide better sound.

Finally, though David showed how to find the sound on *his* CoCo, his instructions won't work on some other CoCo models. David's instructions work fine on CoCo 1s. But on most CoCo 2 models, and all CoCo 3 models, the sound line is at Pin 1 of the custom DAC chip. This is a 20-pin chip marked SCC77526P on most computers. On the CoCo 3 sound can also be obtained, of course, from the audio output jack in the computer.

Next, Michael's article presents a rather faulty technical tip. His first hardware tip says that owners of the old CoCo 1 disk controller (Cat. No. 26-3022) can use the contoller on a CoCo 2 or 3 if they rig up a +12-volt source for that card. Although this is true for the CoCo 2, Michael does not mention that, even with the 12-volt source, the controller will not work properly at double CPU speed. Therefore, if you run OS-9 Level II or any Disk BASIC program that does disk I/O at double processor speed, at best the controller won't work, at worst it will operate unreliably — occasionally crashing disks. The reason is that the data separator circuitry on that old controller is a bit sloppy, and there is no simple fix for that problem. Both my column and the "Doctor ASCII" column have warned of this problem before. I strongly advise readers *not* to use that controller in their CoCo 3s. Buy a new one, instead.

Marty Goodman
San Pablo, CA

REVIEWING REVIEWS

Editor:

Needless to say, we at SPORTSware were very pleased, even honored to see the treatment given to the *Wargame Designer* system in the August '88 issue [Page 126]. We tried to create a game-designing system that would fill what we saw a void in the wargame and Adventure game market.

We would also like to comment on the reviews of John Herbert, reviewer of *Wargame Designer.* We have noticed his reviews in the past and have always found them enjoyable. His unique style and humor are refreshing. Unlike some reviewers, who feel that a recitation of the user's manual is enough, you can always tell whether or not Mr. Herbert enjoyed a software package. Feelings are what reviews are all about, and John Herbert relates them with ease. Let's hope that he continues to share his time and talent with the CoCo Community.

Paul L. Olmstead
President

Fair is Fair

Editor:

First, I would like to commend you for your fine magazine. RAINBOW's excellent articles and reviews have helped me enjoy my CoCo. I pay particular attention to RAINBOW's reviews. After reading reviews on *CoCo Newsroom*, *Kung-Fu Dude*, and *Rommel 3D*, I purchased the products. I found certain flaws that were not properly covered in the reviews, and I would like to comment on them now.

Despite *CoCo Newsroom*'s icons, you cannot return to the main menu from type-up. You must re-boot the program. Although knowing this may not have stopped me from buying this program (for it is excellent in all other ways), I think that the review should have mentioned this problem.

Kung-Fu Dude's review mentions that the program is copy-protected. The copy-protection does not appear to be benign. I couldn't get the program to boot. When I called the author, he said that he had encountered this problem before. The fault seems to be with the timing of some drives and the way the program boots the encrypted graphics from Track 0. I have returned the game, and the company is still working on the problem. Perhaps this is an example of the way a vendor can actually thwart future purchases through copy-protection.

Finally, the graphics in *Rommel 3D* have been compromised by the program's demand for speed. Although the game moves quickly and is mildly entertaining, I've seen better games and graphics in BASIC published in THE RAINBOW. I realize that some of my comments (especially for the last product) are subjective, and I see only two choices for me and for others who purchase "less than perfect" software: complain to the vendor or just accept the flaws.

Product reviews should be fair. They let your readers know what is new on the market. They should also temper and confirm the advertiser's claims. I will continue to read your magazine and purchase software from the vendors you review.

Wayne Montague
Mississauga, Ontario

We agree that reviews should be fair. Therefore, we will be working toward more serious "play testing" in-house. We regret it if we've allowed recommendations for flawed products to slip through.

HINTS & TIPS

Editor:

Paul Pritchett [July '88, Page 7] requested a way to hard copy *Micro Illustrator* pictures. I suggest these steps. PCLEAR 8 your CoCo; boot up *Micro Illustrator* and load the picture from the disk. Return to Disk BASIC by removing the disk and pressing RESET twice. Then, run the following program:

```
10 PMODE 4,1:SCREEN 1,1 'WATCH
  OUR PROGRESS
20 FOR X=8252 TO 14396 'PICTURE
  SITS HERE
30 A=PEEK(X):POKE X-4668,A 'MOVE
  PICTURE
40 NEXT X:SOUND 20,1 'BEEP WHEN
  DONE
```

This will move *Micro Illustrator*'s picture to Disk BASIC graphics pages 1 through 4, where any trusty graphic dump program can do its stuff. Hope this helps!

Charles Doane
Miami, FL

CoCo 3 Artifacting

Editor:

I have tested some machine language programs with the CM-8 patch program listed in the February '88 issue ["Artifact Colors on CoCo 3's RGB," Page 114]. Each of the following will display color when executed on a CoCo 3 with a CM-8 monitor:

From Tom Mix: *Donkey King*, *Draconian*, *Buzzard Bait*, *Brew Master* and *Skyway.*
From Spectral Associates: *Lancer*, *Miss*

RUNS ON COCO 2 & 3

AUTOTERM
TURNS YOUR COLOR COMPUTER INTO THE
WORLD'S
SMARTEST TERMINAL!
YOU'LL ALSO USE AUTOTERM FOR SIMPLE
WORD PROCESSING & RECORD KEEPING

EXTRA FEATURES ON COCO 3 DISK
80 char. screen, 2400 baud thru serial port,
95,000 to 475,000 character buffer.

EASY COMMUNICATION + WORD PROCESSING + TOTAL AUTOMATION

Full prompting and error checking. Step-by-step manual has examples. Scroll text backward and forward. No split words on screen or printout. Save, load, delete files while on line. Print, save all or any part of text. 300 or 1200 baud. All 128 ASCII characters. Works with D.C. Hayes or any modem. Screen widths of 32, 40, 42, 51, 64.
DISK VERSION SUPPORTS RS232 PAK, XMODEM and SPLIT SCREEN FOR PACKET RADIO.

Editing is super simple with the cursor. Find strings instantly too! Insert printer control codes. Specify page size and margins. Switch quickly between word processing and intelligent terminal action. Create text, correct your typing errors; then connect to the other computer, upload your text or files, download information, file it, and sign-off; then edit the receive data, print it in an attractive format, and/or save it on file. Compatible with TELEWRITER.

Advanced system of keystroke macros lets you automate any activity, such as dial via modem, sign-on, interact, sign-off, print, save. Perform entire session. Act as message taker. At start-up, disk version can automatically set parameters, dial, sign-on, interact, read/write disk, sign-off, etc. Timed execution lets AUTOTERM work while you sleep or play. No other computer can match your COCO's intelligence as a terminal.

Please hire the mentally retarded. They are sincere, hard working and appreciative. *Thanks!*
Phyllis.

CASSETTE $29.95
DISKETTE $39.95
Add $3 shipping and handling
MC/VISA/C.O.D.

PXE Computing
11 Vicksburg Lane
Richardson, Texas 75080
214/699-7273

Gobbler, *Devious*, *Color Zap*, *Qiks*, *Space Attax* and *Space Wrek*.
From Radio Shack: *Shooting Gallery*, *Popcorn*, *Mega-Bug* and *Radio Ball*.
From Computer Shack: *Time Bandit* and *Fury*.
From The Rugby Circle: *Caterpillar*.
From Mark Data: *Tut's Tomb*.
From Anteco Software: *8 Ball*.
From T&D Software: *Able Builders*.
From Adventure International: *Arex*.
From Factory Programming: *Outhouse*.

Note: If you use the patch while playing a game that switches between the graphics screen and text screen, sometimes you will only see vertical and/or horizontal lines. Usually this is not critical because the text screen asks you to enter the number of players, the names, the level, etc. If you play the game without the patch and memorize the screen text, you should be able to play the game with the patch. Also, some of the programs mentioned were on a ROM pack but have been transferred to a disk. Don't try to use the patch with a ROM pack — you can't.

Perry M. Dueck
Rosenort, Manitoba

A CoCo 2 *Color Catalyst*

Editor:

Thanks to everyone in the CoCo Community who took the time to drop a line or call about *Color Catalyst* ["Changing the Language," June '88, Page 168]. As it appears in the magazine, the program will only run on the CoCo 3 and certain models of the CoCo 2. (Tandy changed more than the keyboard when it upgraded our favorite machine.) The following changes in Listing 2 will allow you to use *Color Catalyst* on your CoCo 1 or 2:

```
6 POKE359,57:M=113:N=25:PRINT
  @13,"COLOR";:PRINT@36,A$;:
  PRINT@68,B$;:PRINT@100,C$;
8 PRINT@166,"CUSTOM BASIC
  UTILITY";:PRINT@232,"BY MARC
  CAMPBELL";:PRINT@489,"[C]
  MCMLXXXVII";
16 CLS:PRINT"DO YOU WANT TO
  EXIT?(Y/N)":EXEC44539:A$=INKEY
  $:IFA$="N"THEN10ELSECLS:NEW
30 GOSUB82:PRINTS$"BLACK CHAR
  ACTERS ON GREEN",S$"BLACK CHAR
  ACTERS ON ORANGE":S=163:E=195:
  GOSUB83
31 IFQ=1THENPOKE65314,7ELSE
  POKE65314,8
```

Delete Line 17 and lines 125 through 128.

Please note that the reset patch and many of the custom display options will be lost, but the other aspects of the program should work properly. If you experience an I/O Error when loading a custom version of BASIC, put the machine in an all-RAM mode by running Listing 1 and try again.

My thanks to Chuck Scharmann, president of Club 6809 in Massachusetts, for bringing this problem to my attention and helping me fix it.

Marc Campbell
Ephrata, PA

INFORMATION PLEASE

Editor:

I really enjoy your magazine, especially the letters. I've gotten quite a few ideas from this section.

I enjoy *Hall of Kings* and would like to buy *Hall of Kings II* or *III*. However, Prickly Pear Software is no longer in business. Is anyone else selling these games? I would like to continue the Adventure.

Jerry M. Bedell
St. Peters, MO

Glen Dahlgren, the original programmer of The Hall of Kings, *has obtained all rights from Prickly Pear Software to market his trilogy. You can order the programs from Glen at: Sundog Systems, 21 Edinburg Drive, Pittsburgh, PA 1523; (412) 372-5674.*

Computer Musicians

Editor:

I am seeking help from all CoCoists who use their CoCos for MIDI applications and music composition or arrangement. Has anyone heard of a voicing program for the Yamaha FB-01 that will work with a CoCo 2 or 3? I do some intricate MIDI work that involves the FB-01, and I need a voicing program that allows me to modify some of the voices on the FB-01.

All other major brands of computers have voicing programs that let them modify the sounds of the FB-01. I hope that such a program exists for the CoCo. If it doesn't, such a program would be very lucrative to write.

Val Burke
P.O. Box 86
Red Oak, GA 30272

KUDOS

Editor:

I just finished wading through a stack of bills. The only one that I didn't mind was my RAINBOW subscription renewal. Indeed, you even include a postage-paid envelope for the subscription. Subtle touches like this keep CoCo fans coming back — even when Radio Shack ignores the CoCo and praises its PC compatibles.

You are a class act, RAINBOW.

Mike Shay
Lebanon, PA

In Praise of Rainbow Advertisers

Editor:

I just wanted you to know how much I enjoy RAINBOW each month. You perform a great service for all CoCoists. The software companies who advertise in your magazine also maintain high standards. One such company is Gimmesoft. Mr. DiMarco is helpful and considerate to all his customers. My thanks to you both.

Fred Sharpe
Scarborough, Ontario

Confidence-Builder

Editor:

I would like to thank Marc Campbell for his BASIC editor, *Buddy* ["CoCo's Current Companion," July '88, Page 34]. New to computing, and only an average typist, I've been intimidated by long program listings. I've avoided some programs and typed in others with as much enthusiasm as I usually muster for a trip to the dentist. CoCo's built-in editor only added to my frustration.

Buddy has changed all that. The program has more features than my present word processor, is simple to use and works well with my tape system. Since *Buddy* takes the frustration and tedium out of typing in long listings, I ordered several back issues of THE RAINBOW. *Buddy* and RAINBOW are my CoCo's constant companions.

Kay Greenwood
Crystal Springs, MS

PEN PALS

- I am a 19-year-old who would like pen pals from anywhere in the United States. I have a CoCo 2, FD 501 disk drive, DMP-105 printer, CCR-81 cassette recorder/player and a speech/sound cartridge. I would like someone who likes *Doctor Who*, writing and anything in between. It may take some time, but all letters will be answered.

Dennis Duane Ferrell
712 Gloria Grove
Wiggins, MS 39577

- My brother and I are looking for pen pals from all over the country. We are: Scott, age 13, and Andy, age 14½. We have an ECB CoCo 2, DMP-105 and DMP-230 printers, DCM-3 modem, FD 502 disk drive, and a CCR-81 cassette recorder. We will do our best to respond to all letters.

Andy and Scott Brady
51 Barberton Road
Lake Worth, FL 33467

- I'm 31 years old and own a CoCo 2, tape recorder and a DWP-230. My interests are BASIC and assembly programming (practical programs for me and games for my kids) and word processing. My other interests are history, literature, politics and religion. I will answer all letters.

Dan Weaver
66 Bunn St.
Amsterdam, NY 12010

- I am looking for a pen pal who has the same setup as my system. So far, I have a 64K CoCo 2 and a cassette recorder. I am looking for someone who is a novice like myself who might be able to teach me more about this new computer of mine.

Patti French
Rt. 2, Box 9
Grafton, ND

- I am 37 years old and have a 64K CoCo with disk drive and a DMP-130 printer. I enjoy anything that has to do with computers. I would like to hear from anyone, any age and from anywhere in the world.

Chuck Flowers
P.O. Box 246
Rio Dell, CA 95562

- I would like a pen pal from anywhere. I have a CoCo 2 with one disk drive and two joysticks. I am 10 years old.

Kevin Lewis
256 Elron Cresent
Thunder Bay, ON
Canada P7C 5T5

- I am 16 years old and am looking for pen pals from all over the world. My computer system consists of a CoCo 3, DMP-105, two double-sided disk drives and a modem. I like to program in BASIC09, and I collect CoCo 3 pictures.

Heath Dingwell
Rt. 2 Box 230
Litchfield, CT 06759

- I am 16 years old, and I have the CoCo 2 and 3, FD 500 disk drive, DMP-105 printer and CCR-81 cassette. I am looking for pen pals who enjoy arcade and Adventure games.

Shane Pasiechnyk
P.O. Box 344
Marysville, BC
Canada V0B 1Z0

- I am 15 years old. My family and I own four computers — MC-10, CoCo 2, CoCo 3 and Tandy 1000 EX. We have a DMP-106 printer. I would like to have pen pals from anywhere in the world; age doesn't matter.

Gretchen Silverheel
1633 Summit
Kansas City, MO 64108

BULLETIN BOARD SYSTEMS

- The Port City Exchange is a "Phoenix" BBS system in the Mooresville area. It runs on a 64K CoCo 2 and is up 24 hours a day, seven days a week at (704) 663-6022. The parameters are 300 baud, 8-bit, 1 stop bit, no parity. There are multiple message bases and upload/download capacity. *Galactic Conflict* is the online game.

Douglas C. Henderson
(NICKO)
539 Dixie Drive
Mooresville, NC 28115

- There's a new BBS in southern California that needs CoCo users! We have room for uploads and downloads and have some great SIGs and message areas. We operate at 300/1200 baud, N-8-1. Call (818) 995-2461.

Scott Shell (SysOp)
Allen Williams (Co-SysOp)
3425 Clairton Pl.
Encino, CA 91436

- The Drunk Drive [call (517) 893-3091] now has a large archived CoCo download area. The Plastered Board [at (517) 892-7885] and Warped Board [(517) 686-7598] also support the CoCo with a variety of downloads. All are N-8-1, 300/1200 baud and run GT *Powercomm*. Press Q at the menu to have up- and download capacity. Press C to see all file categories. Press F to see all file descriptions. The Drunk Drive and The Plastered Board are online 24 hours a day. Warped Board is online from 6 a.m. to 3 a.m.

Ron Sujkowski
1806 34th St
Bay City, MI 48708

- The Chip to Chip is running at 300/1200 baud, 24 hours a day on a 512K CoCo 3. The system uses *PBBS* software and features message and software exchange for IBM, CoCo and CBM. New members must fill out an online application and use their real names. There is 20 Meg of disk storage space. The SysOp is Allen Jones. Call (902) 539-7743.

David Brown
New Waterford, NS
Canada B1H 4K4

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

Word Power 3.2

More Versatile • More Powerful With
Spooler • Calculator • Split-Screen • 2-Column Printing

Unparalleled Power packed in this 100% ML Word Processor written from scratch for the CoCo 3! **No other word processor offers such a wide array of features that are easy to learn & use.**

DISPLAY & SPEED

Word Power 3.2 runs at double-clock speed and uses the **true 80-column display** with lowercase instead of the graphics screen. The result is lightning fast screen reformatting and added speed! **All prompts are displayed in plain English in neat colored windows.** The current column number, line number, page number, percentage of free memory is displayed at all times. Even the **page break** is displayed so you know where one page ends and the other begins. The Setup program allows you to change fore/background colors as well as (in)visible carriage returns. Word Power 3.2 can be used with RGB/Composite/Monochrome monitors as well as TV.

MAXIMUM MEMORY

Word Power 3.2 gives you **over 72K** on 128K and **over 450K** on 512K CoCo 3 for Text Storage - more memory than any other CoCo word-processor. Period.

EFFORTLESS EDITING

Word Power 3.2 has one of the **most powerful and user-friendly full-screen editor with word-wrap.** All you do is type. Word Power takes care of the text arrangement. The unique **Auto-Save** feature saves text to disk at regular intervals for peace of mind.

Insert/Overstrike Mode (Cursor Style Changes to indicate mode);OOPS Recall during delete;Type-ahead Buffer for fast typers;Key-Repeat (adjustable); Key-Click; 4-way cursor and scrolling; Cursor to beginning/end of text, beginning/end of line, top/bottom of screen, next/previous word; Page up/down; Delete character, previous/next word, to beginning/end of line, complete line, text before/after cursor; Locate/Replace with Wild-Card Search with auto/manual replace; Block Mark, Unmark, Copy, Move & Delete; Line Positioning (Center/Right Justified); Set/Reset 120 programmable tab stops; Word-Count; Define Top/Bottom/Left/Right margins & page length. You can also highlight text (underline-with on-screen underlining, bold, italics, superscripts, etc.). Word Power even has a **HELP** screen which an be accessed any time during edit.

SPLIT-SCREEN EDITING

Splits the screen in half so you can view one portion of your text while you edit another. You'll love it!

MAIL-MERGE

Ever try mailing out the same letter to 50 different people? Could be quite a chore. Not with Word Power 3.2! Using this feature, you can type a letter, follow it with a list of addresses and have Word Power print out personalized letters. It's that easy!

CALCULATOR

Pop-up a 4-function calculator while you edit! Great for tables!

SAVING/LOADING TEXT

Word Power 3.2 creates ASCII format files which are compatible with almost all terminal/spell-checking & other word-processing programs. Allows you to Display Free Space, Load, Save, Append & Kill files. The ARE YOU SURE? prompt prevents accidental overwriting & deletion. You can select files by simply cursoring through the disk directory. Supports double-sided drives & step-rates.

PRINTING

Word Power 3.2 drives almost any printer (DMP, EPSON, GEMINI, OKIDATA, etc). Allows options such as baud rates, line spacing, page/print pause, partial print, page numbering/placement, linefeeds, multi-line headers/footers, right justification & number of copies. The values of these parameters & margins can be changed anytime in the text by embedding Printer Option Codes. The **WHAT YOU SEE IS WHAT YOU GET** feature allows you to preview the text on the screen as it will appear in print. You can view margins, page breaks, justification & more.

PRINT SPOOLER

Why buy a hardware Print Spooler? Word Power 3.2 has a **built-in Spooler** which allows you to simultaneously edit one document & print another.

TWO-COLUMN PRINTING

This unique feature allows you to print all or portion of your text in **two columns**! Create professional documents without hours of aligning text.

SPELLING CHECKER

Word Power 3.2 comes with spelling checker/dictionary which finds & corrects mistakes in your text. You can add words to /delete words from dictionary.

PUNCTUATION CHECKER

This checker will proofread your text for punctuation errors such as capitalization, double-words, spaces after periods/commas, and more. Its the perfect addition to any word processor.

DOCUMENTATION

Word Power 3.2 comes with a well-written instruction manual & reference card which makes writing with Word Power a **piece of cake!** Word Power 3.2 comes on an UNPROTECTED disk and is compatible with RSDOS. Only **$79.95**

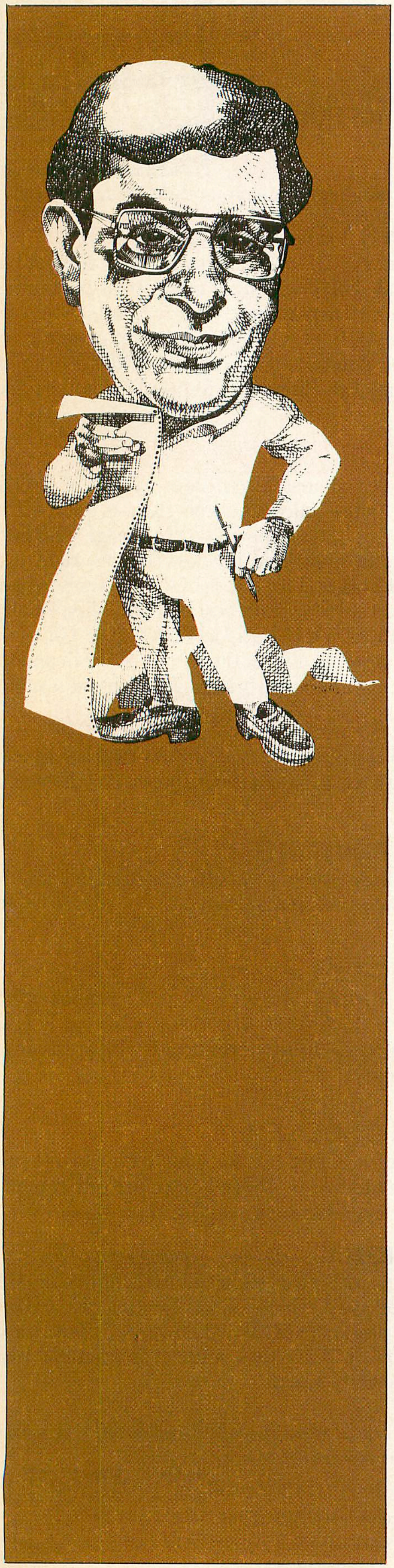
(Word Power 3.1 owners can get Word Power 3.2 Upgrade FREE by sending proof of purchase & $5.00 to cover S&H costs & instructions)

MICROCOM SOFTWARE 2900 Monroe Ave, Rochester,NY 14618. Ph: (716) 383-8830

All orders $50 & above shipped by UPS 2nd Day Air at no extra charge within US. We accept Visa, MasterCard, Amex, Check or MO. Sorry, no CODs. Please add $3 S&H (USA/CANADA); except where specified otherwise; Foreign 10% S&H(minimum $5). New York State residents please add sales tax. Looking for new software/hardware.

To Place Credit Card Orders Call Toll Free 1-800-654-5244 9am-8pm Monday-Saturday

Order Status, Information, Technical Information, call 716-383-8830



October Magic

This is a happy month! There are a whole bunch of things to be happy about right now. First of all, remember that I write these columns a lot earlier than they appear in THE RAINBOW. Production schedules make this necessary, of course, so it is really an interesting exercise from an intellectual point of view: First, I have to project myself into the future and try to place myself in the time you will be reading this; second, I am as usual "full" of something that has just happened in real time (as they say) and want to tell you about it.

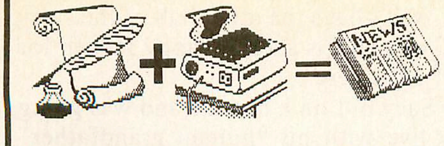
As to what's happening in October itself — it is RAINBOWfest! That really makes me happy, because I sometimes liken RAINBOWfest to the ancient stories of the Scottish Clans' annual gathering. Each time I walk into our convention hotel, I can't help but think of the "Gatherin' o' th' Clans" from legend. Each show is alive with anticipation of new things, new products and, most important of all, new people. We all make new friends and we all renew old acquaintances. And we get an infusion of spirit for our CoCo Community.

All of this is by way of saying I hope you will join us in Princeton October 21st through 23rd.

October, too, begins the start of our busiest half of the year. During the summer, with family vacations, with school out, with the weather so nice, almost everyone's CoCo activity drops a little bit. Why, I remember one year Dick White wanted to take his CoCo on a camping trip with his family, and his wife threatened to hide the batteries he had rigged up!

September means back to work full time and back to school for so many of you (educators as well as students). I know computing sometimes takes a back seat to getting those schedules "set up." But things have usually settled down by October, and we're ready to go. October also means that we have lots of new things on the horizon. After all, the pre- and post-

COCO NEWSROOM



An excellent Desktop Publishing program for the CoCo 3. Design your own newspaper with Banner Headlines/6 Articles using sophisticated Graphics,Fonts & Fill patterns. Comes with 22 fonts & 50 pictures! Over 140K of code. Compatible with Epson, Gemini & Compatibles, DMP 105/106/110/120/130/200/400/420/500/2110, CGP-220, Laser LP1000 & IBM Compatibles. "*... a smash for CoCo 3 ...*" - *March 88 Rainbow Review*. Comes on 3 non copy-protected disks. Only **$49.95**

New Program!
CAR SIGN DESIGNER

Create distinctive bright yellow diamond shaped car signs. Includes 2 resuable clear plastic sign holders with suction cups, and 50 sheets of bright yellow fanfold paper. Printer Requirements are the same as for the CoCo Graphics Designer. Only **$29.95**

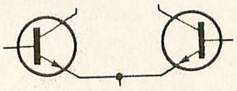
COLOR SCHEMATIC DESIGNER

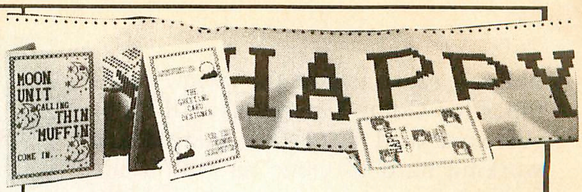
By Prakash Mishra

An excellent Circuit Schematic Design Software Package for CoCo 3. Features:

*** Runs in 640x192 at 1.8 Mhz**
*** Pull Down Menus**
*** Keyboard/Mouse/Joystck Support**
*** RGB/ Composite/Monochrome Monitor Support**
*** 72 Modifiable Symbols**
*** Multiple Hi-Res Fonts**
*** Multiple UNDO Command**
*** Symbol Rotate/Line/Box Draw**
*** Supports 3 Layers of Circuits**
*** Powerful Screen Print Command for DMP/Gemini/Epson Printers**
*** Complete Documentation**

Only $39.95





COCO GRAPHICS DESIGNER

Create beautiful **Greeting Cards, Signs & Banners** for holidays, parties and other occasions. Comes with a library of pre-drawn pictures. Includes utilities to create your own character sets, borders and graphic pictures. Requires CoCo 1,2,3 or TDP-100 with a min. of 32K, one Disk Drive and a Printer. Compatible with Disk Basic 1.0/1.1/2.0/2.1, ADOS(3) and JDOS. Supports the following printers: DMP 100/105/106/ 110/130/ 430; CGP220, EPSON RX/FX, GEMINI 10X, SG-10, NX-10/1000 & OKIDATA. Latest Version! DISK Only **$29.95**
PICTURE DISK #1,#2,#3,#4: Each picture disk contains over 100 pictures !! Disk **$14.95** each. **ALL 4 Picture Disks: $54.95**
FONT DISK #1,#2,A,B: Each disk contains 10 extra fonts!! Disk **$19.95** each. Buy any 3 Font Disks and get the 4th FREE!!
COLORED PAPER PACK (with matching envelopes): $24.95

GAMES

(Disk only)
(CoCo 1,2 & 3 except where mentioned)

WILD WEST (CoCo 3 Only): $24.95
VEGAS SLOTS(CoCo 3 only): $29.95
VEGAS GAME PACK: $24.95
FLIGHT 16: $34.95
P-51 MUSTANG SIMULATION: $34.95
WORLDS OF FLIGHT: $34.95
PYRAMIX(Cubix for CoCo 3): $24.95
KUNG FU DUDE: $24.95 **CHAMPION**: $19.95
WHITE FIRE OF ETERNITY: $19.95
IN QUEST OF STAR LORD(Animated Graphics Adventure for CoCo 3): $34.95
TREASURY PACK#1: Lunar Rover Patrol, Cubix, Declathon, Qix, keys of Wizard, Module Man, Pengon, Space Wreck & Roller Controller.Only $29.95
TREASURY PACK #2: Lancer, Ms. Gobbler, Froggie, Madness & Minotaur, Ice Castles, Galagon, Devious and Syzygy. Only $29.95
SPACE PAC: Color Zap, Invaders, Planet Invasion, Space Race, Space War, Galax Attax, Anaroid Attack, Whirlybird, Space Sentry & Storm Arrows.Only $29.95
WIZARD'S CASTLE: A hi-res graphics adventure game filled with traps, tricks, treasures. Only $19.95

XENOCOPY-PC

NEW

An amazingly versatile program that allows you to Format/Duplicate / Read/ Write disks from over 300 different computers. For example you could transfer programs between CoCo, IBM, PC-DOS, TRS-80 Model 3, TRS-80 Model 4, TRS-80 Model 100, Xerox 820, Zenith, Kaypro II, Novell, NEC DOS and much much more!! Send for FREE List. Requires an IBM Compatible with 2 drives. Disk $79.95.

512K BACKUP LIGHTNING

NEW

The ultimate CoCo 3 disk copying utility!! Reads your master diskette once and then makes as many copies as you want. It automatically formats an unformatted disk while copying! Supports 35, 40 or 80 track drives with various step rates. A must for any disk user!! Only $19.95

PRINTER LIGHTNING

Never wait for your printer again!! This Print Spooler allows you to print to your printer and simultaneously continue with your programming. No need to wait for those long printouts! Disk Only $19.95

BASIC FREEDOM

NEW

A Full Screen Editor for Basic Programs!! A Must for anyone who writes Basic Programs. Only $24.95

VOCAL FREEDOM

Turn your computer into a digital voice / sound recorder. Produces natural voices/ sound effects. Req. inexpensive RS Amplifier (#277-1008) & any microphone. Only $34.95

HACKER's PAC

Allows you to incorporate voices created by Vocal Freedom into your own Basic and ML programs. Only $14.95

MICROCOM SOFTWARE 2900 Monroe Ave, Rochester,NY 14618. Ph: (716) 383-8830 VISA MasterCard AMERICAN EXPRESS

All orders $50 & above shipped by UPS 2nd Day Air at no extra charge within US. We accept Visa, MasterCard, Amex, Check or MO. Sorry, no CODs. Please add $3 S&H (USA/CANADA); except where specified otherwise; Foreign 10% S&H(minimum $5). New York State residents please add sales tax. Looking for new software/hardware. DISCOVER

To Place Credit Card Orders Call Toll Free 1-800-654-5244 9am-8pm Monday-Saturday
Order Status, Information, Technical Information, call 716-383-8830

holiday seasons are the prime sales times for Color Computers. All those software and hardware people are working hard to come up with some new ideas to make your CoCo even more enjoyable.

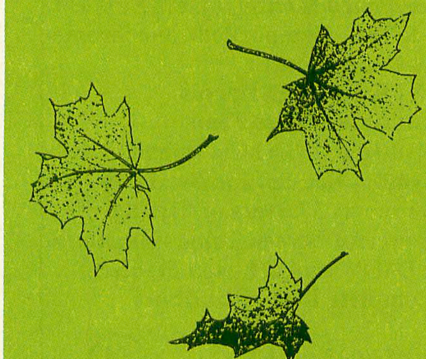
* * *

But here in Prospect, Kentucky, as I write this I am only projecting into October. Still, it is a very happy month right now — perhaps some "October magic" is taking place!

Just a few days ago my daughter Wendy married Ira Barsky. Many of you who have been to RAINBOWfest may have met Wendy, and probably almost all of you have met Ira. My other daughter, Laurie, was Maid of Honor, and it was a very happy day for every one of us.

Long-time readers of this column will probably be asking where Sacy is living, now that Wendy has "fled the nest." Sacy is Wendy's teddy bear of many years who was almost lost when Wendy took a "Semester At Sea" and someone picked up her duffle bag by mistake as she landed back in the United States in Seattle.

> ***"October . . . means that we have lots of new things on the horizon."***



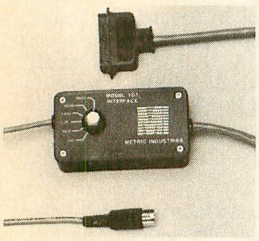
Well, that's the other half of the story of why this is such a happy month for all of us here.

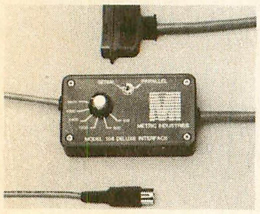
Sacy put on a bow tie and was going to live with his "human grandfather" (me) for a couple of weeks, since Wendy somehow felt it inappropriate to take a teddy bear on her honeymoon. However, several days before the wedding some chest pains sent me to the hospital, and a few days after the wedding I went in for an angioplasty — a procedure doctors use to remove fatty buildup in coronary arteries.

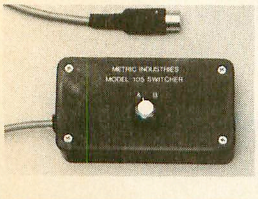
Wendy and Ira delayed their wedding trip (much to my displeasure, I might add), and Sacy went to live at Wendy's new home while I was in the hospital. I am pleased to report the procedure came off splendidly, and I was back at the office — although on a limited basis for a while — three days after the angioplasty. Sacy is living here, supervising my recovery, and will stay until Wendy and Ira return from their trip.

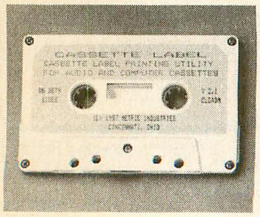
So, it is a good month. We're glad you're with us. And we're glad to be with you!

— Lonnie Falk









METRIC INDUSTRIES, INC.

Model 101
Serial to Parallel Printer Interface

- ★ Works with any COCO
- ★ Compatible with "Centronics" Parallel Input Printers
- ★ Just turn the knob to select any one of 6 baud rates 300-9600
- ★ Comes complete with cables to connect to your printer and computer
- ★ Can be powered by most printers

Model 104 Deluxe Interface with "Modem Switch"

- ★ **Same Features as 101 Plus**
- ★ Built in Serial Port for your Modem or other serial device
- ★ Switch between Serial Output and Parallel Output
- ★ Comes with cables to connect to your computer and printer
- ★ Can be powered by most printers

Model 105 Serial Switch

- ★ Connects to your COCO to give you 2 switch selectable Serial Ports
- ★ Comes with a 3 foot cable to connect to your computer
- ★ Now you can connect your Printer (or printer interface) and your Modem (or other serial device) to your COCO and flip the switch to use either device
- ★ Does not require power

Cassette Label Printing Program

- ★ **New Version 2.1 prints 7 lines** of information on Cassette labels
- ★ Comes on Tape with instructions to transfer to disk
- ★ Menu driven, very easy to use
- ★ **Save and Load Labels from Tape and Disk**
- ★ Uses the features of your printer to print standard, expanded, and condensed characters
- ★ **Automatically Centers Each Line of Text**
- ★ Allows editing of label before printing
- ★ Program comes with 24 labels to get you started
- ★ 16K ECB required

Some of the Printers That Can –
Supply power for the 101 and 104 are Radio Shack, Star, Okidata, Brother, Juki, and Smith Corona.

Some of the Printers That Cannot –
Supply power for the interfaces are Epson, Seikosha, Panasonic, Silver Reed and NEC. If your printer cannot supply power to the interface you can order your interface with the "P" option or you can supply your own AC adapter. We recommend the Radio Shack 273-1431 AC adapter with a 274-328 connector adapter.

Write or call for more information or for technical assistance.

Price List

Model 101	**35.95**
Model 101P	41.95
Model 104	44.95
Model 104P	51.95
Model 105	14.95
Cassette Label Program	6.95
Pin Feed Cassette Labels:	
White	3.00/100
Colors (specify)	3.60/C
Red-Blue-Yellow-Tan	

4 Pin Din Serial COCO Cables:

Male/Male 6 foot	4.49
Male/Female 6 foot	4.49
Female/Female 6 foot	4.49
Other Lengths Available.	

All items covered by a 1 year warranty

Ordering Info

- ★ **Free Shipping** in the U.S.A. (except AK and HI) on all orders over $50
- ★ On orders under $50 please add $2.50 for shipping and handling
- ★ On orders outside the U.S.A. please write or call for shipping charges

You Can Pay By:

- ★ VISA or MasterCard
- ★ C.O.D. - add $2.25
- ★ Or send check or money order payable in U.S. funds

Metric Industries Inc.
P.O. Box 42396
Cincinnati, OH 45242

(513) 677-0796

COCO 3 UTILITIES GALORE

(CoCo 2 Versions Included where specified)

SUPER TAPE/DISK TRANSFER

* Disk-to-Disk Copy * Tape-to-Disk Copy
* Tape-to-Disk Auto Relocate
* Disk-to-Tape Copy * Tape-to-Tape Copy
Copies Basic/ML/Data Files. CoCo 1,2 or 3. Req. min. 64K Disk System. Disk Only **$24.95**

COCO CHECKER

Something possibly wrong with your CoCo? CoCo Checker is the answer. Will test your ROMs, RAMs, Disk Drives & Controller, Printer, Keyboard, Cassette, Joysticks, Sound, PIAs, VDG, Internal Clock Speed, Multi-Pak Interface and more! Only **$24.95**

DISK UTILITY 2.1A

A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move, rename & kill file entries. Lightning fast Disk I/O for format, copy & backup. Single key execution of Basic/ML programs. This will become your MOST USED program !! CoCo 1,2 or 3. Req. Min. 64K. Disk Only **$24.95**

MAILLIST PRO

The ultimate mailing list program. Allows you to add, edit, view, delete, change, sort (by zipcode or name) and print labels. Its indispensible!! Disk **$19.95** (CoCo 2 version included)

DISK LABEL MAKER

Allows you to design professional disk labels! Allows elongated, normal and condensed format for text. Double Strike, Border Creation, and multiple label printing. Its a MUST for any user with a disk drive. Supports DMP 105/106/110/120/ 130/430, GEMINI, STAR, EPSON and compatibles. (CoCo 2 version included). Only **$19.95**

COCO UTIL II

COCO-DOS MS-DOS

(Latest Version): Transfer CoCo Disk files to IBM compatible computer and vica-versa. Requires 2-Drive IBM Compatible. Disk **$39.95**

RGB PATCH

Displays most games in color on RGB monitors. CoCo 3 Disk **$24.95**

COMPUTERIZED CHECKBOOK

Why bother with balancing your checkbook? Let the CoCo do it for you. Allows you to add, view, search, edit, change, delete and printout (in a table/individual entry format) checkbook entries. Updates balance after each entry. Allows files for checking, savings, and other accounts. Disk **$19.95.** (CoCo 2 version included)

BOWLING SCORE KEEPER

An excellent utility to keep track of your bowling scores. Allows you to save scores under individuals or teams. You can edit change, delete, and compare scores. A must for anyone who wants to keep track of his or her bowling performance. Disk $19.95 (CoCo 2 version included)

VCR TAPE ORGANIZER

Organize your videotapes with this program. Allows you to index tapes by title, rating, type, play time and comments. Also allows you to sort titles alphabetically & view/print selected tapes. If you own a VCR, this program is a MUST!! Disk $19.95 (CoCo 2 version included)

COCO 3 SCREEN DUMP

Fantastic

32, 40, 80 column text dump, PMODE 4 Graphics Dump. Single Keystroke Operation allows you to take snapshots of your screens even when programs are running! Works on DMP's, Epson, Gemini and compatibles. CoCo 1, 2 and 3. Disk **$24.95**

HOME BILL MANAGER

Let the CoCo keep track of your bills. Allows you to enter bills under various categories and reminds you when they are due. Disk **$19.95**

CALENDAR MAKER

Generate monthly calendars on your printer for any year in the 20th century. Disk Only **$19.95** (CoCo 2 version included)

ADOS 3

Advanced disk operating system for CoCo 3. Comes on disk and is EPROMable!! Disk **$34.95.** **ADOS** (for CoCo 1,2): **$27.95**

OS 9

OS9 LEVEL II OPERATING SYSTEM

Supports 512K RAM dual speed, multi-tasking, multiple windows, and more!! Comes with disk and complete documentation. Only **$89.95**

MULTI-VUE

User friendly graphics interface with multiple "window" applications for Level II. Only **$54.95**

WIZ

OS9 Level II Terminal Package with 300-19200 baud rate and windowing capability. Requires 512K and RS-232 Pack. Only **$79.95**

DYNASTAR

Best OS9 Editor/Word Processor Text Formatter. Has Keyboard Macros, supports terminals & windows simultaneously, configurable, auto-indent for C/Pascal programming, mail-merge. New Manual makes it easier than ever. Only **$149.95. DynaSpell $49.95. Both Dynastar and Dynaspell: Only $174.95**

DYNACALC OS-9

Excellent spreadsheet for OS-9 users. Only **$99.95**

OS9 LEVEL II BBS

NEW

BBS program that supports multiple users and sysop definable menus. Includes the following: Tsmon, Login, Chat, Message Retrieval, Mail Retrieval, Uloadx, Dloadx, and much more! Req. 512K. Only **$29.95**

PC-Xfer UTILITIES

Programs to format and transfer files to/from MS DOS diskettes on CoCo Under OS9 Level 1 and 2. Requires SDISK or SDISK 3. Only **$44.95**

SDISK 3

Standard disk drive module replacement allows full use of 40/80 track *double-sided* drives. Req. OS9 Level II. Only **$29.95. SDISK: $29.95**

OS9 LEVEL II RAMDISK

Lightning Fast Ramdisk with Auto-Formatting. A must for any OS9 Level II user. Req 512K. Only **$29.95**

OS9 BOOKS:

Inside OS9 Level II: **$39.95**
Rainbow Guide to OS9 II: **$19.95**
Rainbow Guide to OS9 II Disk: **$19.95**

OS9 Reference Card: FREE with any OS9 Purchase!!!

MJP MICROCOM SOFTWARE 2900 Monroe Ave, Rochester,NY 14618. Ph: (716) 383-8830 VISA MasterCard AMERICAN EXPRESS

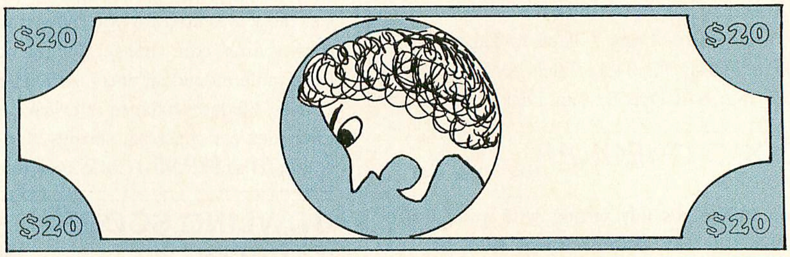
All orders $50 & above shipped by UPS 2nd Day Air at no extra charge within US. We accept Visa, MasterCard, Amex, Check or MO. Sorry, no CODs. Please add $3 S&H (USA/CANADA); except where specified otherwise; Foreign 10% S&H(minimum $5). New York State residents please add sales tax. Looking for new software/hardware. DISCOVER

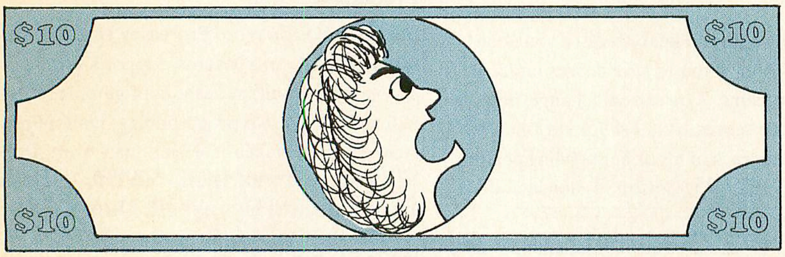
To Place Credit Card Orders Call Toll Free 1-800-654-5244 9am-8pm Monday-Saturday

Order Status, Information, Technical Information, call 716-383-8830

A program to help roommates organize expenses in a fair, precise manner

Bills! Bills! Bills!





By David Turner

Many people today have roommates. One of the main arguments that roommates have is bill payment — who pays what and how much. *Roommate* helps solve that problem and keeps a record of expenses and payments.

When starting the program, you are asked if you are creating a new file or loading a previous file. If you are creating a new file, you are asked the name of the roommate and given a list of expenses. The percentage of each expense to be paid is entered as a whole number, i.e., 90 percent = 90 not .90. When you have entered all the expenses of that roommate, you are prompted for information on the next roommate. Once you have entered information on all roommates, press ENTER to continue the program.

Next, you are asked if you want a printout of each expense that is percentage paid. The printout lists the roommate number and the corresponding percentage of payment per expense. Note that you may exceed 100 percent on any expense, total expenses, or the overall sum of expenses.

You are then asked if you need to change a roommate. This will include the name and all expenses. Simply answer the questions.

```
Susan
STATEMENT DUE DATE IS: 10-15-88
RENT                      $175.00
PHONE                      $17.10
CATV                       $17.50
WATER/SEWER                $15.00
GAS                         $0.00
TRASH                      $25.00
ELECTRICITY                $62.25
TOTAL                     $311.85

UNPAID FROM LAST BILL     -$15.50 CREDIT

PAYMENT                   $320.00

TOTAL NOW DUE             -$23.65 CREDIT

Susan TO DATE TOTALS
  PAYMENTS      RENT    PHONE      CATV  ELECTRIC     WATER       GAS     TRASH
   $640.00   $350.00   $36.60    $35.00   $114.75    $30.00     $0.00    $50.00
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$


Lisa
STATEMENT DUE DATE IS: 10-15-88
RENT                      $175.00
PHONE                      $39.90
CATV                       $17.50
WATER/SEWER                $15.00
GAS                        $38.00
TRASH                       $0.00
ELECTRICITY                $20.75
TOTAL                     $306.15

UNPAID FROM LAST BILL       $0.50

PAYMENT                   $310.00

TOTAL NOW DUE              -$3.35 CREDIT

Lisa TO DATE TOTALS
  PAYMENTS      RENT    PHONE      CATV  ELECTRIC     WATER       GAS     TRASH
   $620.00   $350.00   $85.40    $35.00    $38.25    $30.00    $78.00     $0.00
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
```

David Turner, an Emergency Medical Technician in Little Rock, is interested in computers, photography and astronomy, and has written custom programs for business.

Books That Can Launch A 1000 Programs!!

Pokes, Peeks and Execs are your guides into the jungle of computer programming. These commands give you the power of Machine Language without leaving the security of BASIC. Each book is a collection of "inside" information, with explanations and examples to help you immediately put it to use. Everyone from the novice to the professional will find these handy books a wealth of information.

300 POKES, PEEKS, 'N EXECS for COCO III

- *40/80 column Screen Text Dump
- *Save Text/Graphics Screen to Disk
- *Command/Functions Disables
- *Enhancements for CoCo3 BASIC
- *128K/512K RAM Test Program
- *HPRINT Character Modifier

Only *$19.95*

500 POKES PEEKS,'N EXECS

- *Autostart your BASIC programs
- *Disable Color BASIC/ECB/Disk BASIC commands
- *Disable Break Key/ Clear Key/ Reset Button
- *Generate a Repeat-key
- *Transfer ROMPAKs to tape
- *Set 23 different GRAPHIC modes
- *Merge two BASIC programs
- *And much much more!!!

For CoCo 1,2 and 3. Only *$16.95*

SUPPLEMENT TO 500 POKES,PEEKS, 'N EXECS

200 additional Pokes,Peeks *and Execs (500* Pokes Peeks 'N Execs is a prerequisite)

- *ROMPAK transfer to disk
- *PAINT with 65000 styles
- *Use of 40 track single/double sided drives
- *High-speed Cassette Operation
- *Telewriter, EDTASM+ CoCo Max enhancements
- * Graphics Dump (for DMP printers) /Text Screen Dump

For CoCo 1,2 or 3. Only *$9.95*

ALL 3 BOOKS for $39.95

UNRAVELLED SERIES

An invaluable aid for Basic and Machine Language programmers, these books provide a complete disassembly and annotated listing of the BASIC/ECB and Disk ROMs. These listings give complete, uninterrupted memory maps of the four ROMs. Gain complete control over all versions of the color computer.

EXTENDED COLOR BASIC UNRAVELLED: COLOR BASIC and EXTENDED BASIC ROM Disassembly: **$39.95**
DISK BASIC UNRAVELLED: DISK BASIC ROM 1.1 and 1.0 Disassembly : **$19.95**
BOTH ECB AND DISK BASIC UNRAVELLED: $49.95
SUPER EXTENDED BASIC UNRAVELLED: SUPER EXTENDED BASIC ROM Disassembly for CoCo 3. **$24.95**
COMPLETE UNRAVELLED SERIES (all 3 books): $59.95

COCO LIBRARY

CoCo 3 Service Manual: **$39.95**
CoCo 2 Service Manual: **$29.95**
Inside OS9 Level II: **$39.95**
Rainbow Guide To OS9 Level II: **$19.95**
Rainbow Guide To OS9 II (disk): **$19.95**
Complete Guide To OS9 (Level 1): **$19.95**
Complete Guide To OS9 (2 Disk): **$29.95**
CoCo 3 Secrets Revealed: **$19.95**
Basic Programming Tricks: **$12.95**
Assembly Language Programming(tepco): **$18**
Addendum For CoCo3 (tepco): **$12**
Color Computer Disk Manual (with ref card): **$29.95**

OTHER SOFTWARE ...

COCO MAX III (with hi-res interface): **$79.95**
COCO MAX II: Disk **$77.95** Tape **$67.95**
MAXFONTS #1,.#2,#3,#4: Disk **$19.95** Each
CGP-220 Driver Kit For CoCo Max III: **$19.95**
MAXPATCH: Run COCO MAX II on COCO 3. **$24.95**

TELEWRITER 64 (COCO 1&2) :Disk **$57.95** Tape **$47.95**
TW-80: COCO3 features for TW-64 Disk **$39.95**
TELEFORM: Mailmerge/form letters for TW-64 Disk **$19.95**

AUTOTERM: Universal modem software Disk **$39.95** Cas **$29.95**

PRO-COLOR FILE *ENHANCED*: Multi-feature Database **$59.95**
PRO-COLOR FORM & DIR: Forms/directories for PCF. **$24.95** **SIDEWISE:** Print ASCII files sideways **$24.95**

EDT/ASM 64D: Editor-assembler (specify 1,2,3) **$59.95**
SOURCE: CoCo Disassembler **$34.95** **SOURCE III: $49.95**
CBASIC: Best Basic compiler **$149.95** **CBASIC III: $149.95**

WINDOW MASTER

NEW!

The hottest program for your CoCo 3!! Imagine using Windows, Pull-Down Menus, Buttons, Icons, Edit Field, and Mouse Functions in your Basic Programs. No need to use OS9. It uses the 640x255 (or 320x255) hires graphics mode for the highest resolution. Up to 31 windows can appear on the screen at one time. Need extra character sets? Window Master supports 5 fonts in 54 sizes! How about an enhanced Editor for Basic? It gives you a superb Basic Editor which leaves the standard EDIT command in the cold. And don't forget that many existing Basic/ML programs will operate under Window Master with little or no changes. In fact, it does NOT take up any memory from Basic. Requires 1 Disk Drive, RS Hi-res Interface & Joystick or Mouse. Specify 128K/512K. **$69.95** Window Master & Hi-Res Interface. Only **$79.95**

FUNCTION KEYS

F1 Save & Display — F2 Enhance Text

Use F1,F2, ALT, CTRL Keys on your CoCo 3!!! If you program in Basic, this program is a must! Only **$14.95**

Looking For New Software. If you have a Basic or ML program which you would like to market, contact us! We pay excellent royalties!!!

MICROCOM SOFTWARE 2900 Monroe Ave, Rochester,NY 14618. Ph: (716) 383-8830 VISA MasterCard AMERICAN EXPRESS DISCOVER

All orders $50 & above shipped by UPS 2nd Day Air at no extra charge within US. We accept Visa, MasterCard, Amex, Check or MO. Sorry, no CODs. Please add $3 S&H (USA/CANADA); except where specified otherwise; Foreign 10% S&H(minimum $5). New York State residents please add sales tax. Looking for new software/hardware.

To Place Credit Card Orders Call Toll Free 1-800-654-5244 9am-8pm Monday-Saturday
Order Status, Information, Technical Information, call 716-383-8830

The program now asks if you need to change the percentage paid. This is similar to the previous prompt. It simply verifies the percentages of payment for each roommate.

Now the program asks for the following expenses: Rent, Phone, CATV, Water/Sewer, Gas, Trash and Electricity. Enter the monthly amounts.

You may give the bill's due date and use the date as a reference for your statements.

The printout option gives you a printout that details expenses and payments. The screen print option lists the expenses on the screen. This is generally used as a review. Use SHIFT-@ to stop scrolling.

After completing the printouts, you are asked to save the data. The data file uses an extension to label each month. You might use the last digit of the year and the month number. For example, January, 1988 becomes 801. December 1988 becomes 812. January 1989 becomes 901. This enables you to keep monthly records on disk. The program also lets you delete the previous month.

If you want to convert this program to cassette, change the following lines:

```
1510 OPEN"O",#-1,FP$
1530 WRITE#1 to WRITE#-1
1550 CLOSE#-1
1610 OPEN"I",#-1,EC$
1630 IFEOF(-1)THEN1660
1640 INPUT#1 to INPUT#-1
1660 CLOSE#-1
```

And delete lines 1490, 1560, and 1590.

Roommate solves many of the problems involved with sharing apartment expenses. The program can help roommates remain friends.

(Questions or comments concerning this program may be directed to the author at P.O. Box 5062, Little Rock, AR 72225. Please enclose an SASE when requesting a reply.) ☐

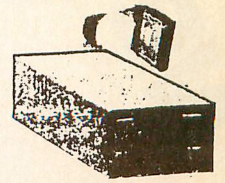
270	141	1050	85
430	197	1240	72
630	248	1490	199
860	51	END	204

The listing: ROOMMATE

```
10 'COPYRIGHT 1988
20 'BY DAVID H. TURNER
30 'POB 5062
40 'LITTLE ROCK, ARK.  72225
50 CLEAR1000
60 VERIFYON
70 CLS
80 INPUT"<L>OAD PREVIOUS DATA OR
          <C>REATE NEW DATA";R$:I
FR$="L"THEN1580ELSEIFR$="C"THEN9
0ELSE70
90 Z=0
100 Z=Z+1
110 IFZ>6THEN230
120 CLS
130 PRINT"ROOMMATE #"Z
140 LINEINPUT"NAME ";NA$(Z)
150 INPUT"% PAY FOR RENT";RC(Z)
160 INPUT"% PAY FOR PHONE";PC(Z)
170 INPUT"% PAY FOR CATV";CC(Z)
180 INPUT"% PAY FOR WATER ";WA(Z
)
190 INPUT"% PAY FOR GAS ";GA(Z)
200 INPUT"% PAY FOR TRASH";SC(Z)
210 INPUT"% PAY FOR APL";AC(Z)
220 GOTO100
230 CLS
240 INPUT"DO YOU WANT A PRINTOUT
  Y/N:";R$
250 IFR$="Y"THENJ=(-2)ELSEJ=0
260 PRINT#J,"RMMT*RENT *PHONE *C
ATV *APL     *WATER    *GAS  *
TRASH"
270 Z=0
280 Z=Z+1
290 IFZ>6THEN380
300 PRINT#J,Z"    ";:PRINT#J,USING
"###";RC(Z);
310 PRINT#J,"      ";:PRINT#J,USI
NG"###";PC(Z);
320 PRINT#J,"  ";:PRINT#J,USING
"###";CC(Z);
330 PRINT#J,"  ";:PRINT#J,USING"
###";AC(Z);
340 PRINT#J,"         ";:PRINT#J
,USING"###";WA(Z);
350 PRINT#J,"      ";:PRINT#J,US
ING"###";GA(Z);
360 PRINT#J,"      ";:PRINT#J,USI
NG"###";SC(Z)
370 GOTO280
380 PRINT:PRINT:
390 INPUT"DO YOU WANT TO CHANGE
A ROOMMATEY/N";R$
400 IFR$="Y"THEN410ELSEIFR$="N"T
HEN510ELSE390
410 PRINT"NAME                  #"
420 Z=0
430 Z=Z+1
440 IFZ>6THEN460
450 PRINTNA$(Z);:PRINTTAB(18)Z:G
OTO430
460 INPUT"WHICH ONE";Z
470 LINEINPUT"NAME ";NA$(Z):INPU
T"% PAY RENT";RC(Z):INPUT"% PAY
PHONE";PC(Z):INPUT"% PAY CATV";C
C(Z):INPUT"% PAY APL";AC(Z)
480 INPUT"% PAY WATER ";WA(Z):IN
PUT"% PAY GAS ";GA(Z):INPUT"% PA
Y TRASH";SC(Z)
```

DISK DRIVES

New Double-Sided Double-Density 360K 40-Track 1/2 ht drives for CoCo 2 & 3. These are the same quality drives that are used in IBM® compatible computers. Buy from someone else and all you get is a disk drive. Buy from us and not only do you get a quality drive but $50 of Free Disk Utility Software (Super Tape/Disk Transfer & Disk Utility 2.1A) and our DISKMAX utility which allows you to access BOTH sides of our drives. It's like buying TWO drives for the price of ONE!! 90-day warranty on *all drives!*



Drive 0 (With **Disto Super Controller!**, Case, Power Supply & Cable):**$229.95** **Drive 1: $149.95**
TWO 1/2 ht Drives in one case with Cable, Case & Disto Controller:**$339.95** **Bare Drive: $89**
J & M Controller (with RSDOS): **$79.95** 1 Drive Cable:**$19.95** 2 Drive Cable: **$24.95** 4 Drive Cable: **$39.95**
DISTO Super Controller: **$99.95** DISTO Super Controller II: **$129.95**
Add Ons: Mini Eprom Prog.: $54.95 RT Clock/Parallel Interface: $39.95 Hard Disk Interface: $49.95 Multi-Board Adapter: $59.95

HARD DRIVE SYSTEMS

Complete w/Hard Drive, WD Controller, B&B Interface, Cables, Case, Power Supply, Software (OS9/Basic) & Instruction Manual. Assembled/ tested/ formatted. Just *Plug'n'Run!!* Multipak Req.
Seagate 20 Meg System: $509 Best Hard
Seagate 30 Meg System: $539 Drive Deal

HARD DRIVE INTERFACES

CoCo XT: Use 2 5-120 Meg Drives with CoCo. **$69.95. w/Real Time Clock: $99.95**
Hyper IO: Allows Hard Drive use with RSDOS. Only **$29.95**
CoCo XT ROM: Boots OS9 from Hard/Floppy Drives. Only **$19.95**
(Multipak Required for Interface)

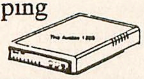
Add $10
S&H
for
Drives

RS232 SUPER PACK

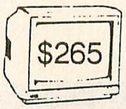
Here it is! True RS232 port for your CoCo. Compatible with **Tandy ® Deluxe RS232 Pack!** Includes DB25 Cable. Req. Multipak. From DISTO so you know its quality! Going fast! Only **$54.95** (CoCo 1,2 or 3) NEW

COMMUNICATIONS EXTRAVAGANZA

1) **AVATEX 1200e MODEM:** Fully Hayes compatible 300/1200 w/ speaker, Auto-Dial/Answer/Redial (Reg $109.95)
2) **MODEM CABLE:** 4 pin to DB25. (Reg $19.95)
3) **AUTOTERM** TERMINAL SOFTWARE (Reg $39.95)
4) **FREE COMPUSERVE OFFER** and Access Time
5) UPS **2nd DAY AIR** Shipping
ONLY **$149.95**
(With **AVATEX** 1200hc instead of Avatex 1200e: **$174.95**)
with **AVATEX 2400: $249.95**



MAGNAVOX 8CM515 RGB MONITOR



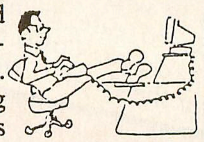
Razor-sharp picture quality for your CoCo! Has 14" screen, Analog/TTL RGB, Composite inputs for CoCo 2/3, Speaker, tilt-stand & 2 year warranty! With a push of a button you can go from RGB to composite mode. This means that ALL your CoCo programs that appear in B&W in RGB mode will appear in color!! Only **$265** (add $12 S&H US/$40 in Canada). **Magnavox** Cable for CoCo 3, Composite/Audio Cable with purchase of monitor: **$19.95**

EPROM

INTRONICS EPROM PROGRAMMER (for CoCo): Programs 2516-27512 & more! Includes software and complete documentation. Latest Version. Lowest Price anywhere! **$137.95**
EPROM ERASER: Fast erase of 24/28 pin EPROMs. Only **$49.95**
BOTH EPROM PROGRAMMER and ERASER: $179.95
EPROMS: 2764-**$8** 27128-**$9** each
Call for other EPROMs
ROMPAK (w/Blank PC Board 27xx Series): **$12.95**
BLANK CARTRIDGE (Disk Controller Size): **Only $10.95**

KEYBOARDS , ETC.

KEYBOARD EXTENSION CABLE: Move your keyboard away from the computer & type with ease. Use your existing keyboard with this cable or leave your present keyboard intact and use a second keyboard. Only **$39.95.**



Cable with CoCo 2 Keyboard: $49.95
Cable with CoCo 3 Keyboard: $69.95
CoCo 3 Keyboard (with free FUNCTION KEYS software value $14.95):**$39.95**
CoCo 2 Keyboard: $19.95

NX-1000 Rainbow Printer

Fully Epson Compatible 7 Color Printer.

Only $259

CABLES

MAGNAVOX 8505/8515/8CM643 Analog RGB Cable: **$24.95**
SERIAL-TO-PARALLEL INTERFACE: Use your parallel printer at high speed (300-9600 baud) with CoCo. Comes will all cables. No software compatibility problems. Only **$44.95**
15" MULTIPAK/ROMPAK EXTENDER CABLE: $29.95
VIDEO DRIVER: Use a monochrome/color monitor with your CoCo. Comes with audio/video cables. Specify CoCo 1 or 2. Excellent picture quality/resolution! **$34.95**
RS232 Y CABLE: Hook 2 Devices to the serial port. Only **$18.95**
Y CABLE: Use your disk system with Speech Pak, CoCo Max, DS69, etc. **$27.95**
RGB Analog Extender Cable:$19.95
SONY Monitor Cable: $29.95
VIDEO CLEAR: Reduce TV interference.**$19.95**
MODEM CABLE:4 pin to DB25.Only **$19.95**
3-POSITION SWITCHER: $37.95
HI-RES JOYSTICK INTERFACE: $11.99

CHIPS, ETC

Disk Basic Rom 1.1 (Needed for CoCo 3): **$29.95** **ECB ROM 1.1:$29.95**
68B09E or 6809E Chip: $14.95
MultiPak PAL Chip for CoCo 3: **$19.95**
PAL Switcher: Now you can switch between the CoCo 2 and 3 modes when using the Multi-Pak. You need the OLDER & NEW PAL chip for the 26-3024 Multipak. Only **$39.95.** With NEW PAL Chip: **$49.95.**
5 1/4" Disks: $0.45 each!

UPGRADES

512K Upgrades for CoCo 3: **$CALL**
64K Upgrade for CoCo I's, CoCo II's with Cat #26-3026/27, 26-3134, 26-3136: **$29.95**
64K Upgrade for 26-3134 A/B CoCo II: **$39.95**
(Free 64K Utility Software incl. with 64K Upgr.)

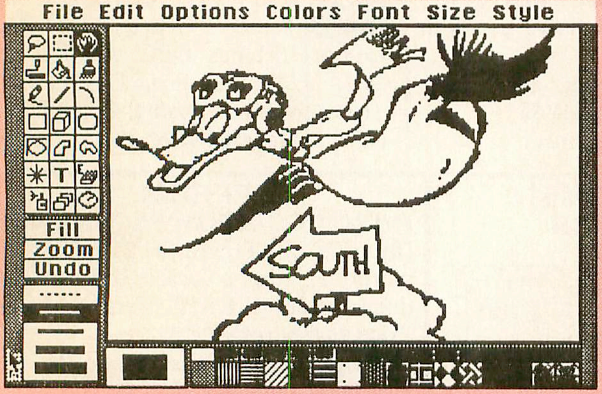
MICROCOM SOFTWARE 2900 Monroe Ave, Rochester,NY 14618. Ph: (716) 383-8830

All orders $50 & above (except drives, printers & monitors) shipped by UPS 2nd Day Air at no extra charge within US. We accept Visa, MasterCard, Amex, Check or MO. Sorry, no CODs. Please add $3 S&H (USA/CANADA); except where specified otherwise; Foreign 10% S&H(minimum $5). New York State residents please add sales tax. Looking for new software/hardware.

To Place Credit Card Orders Call Toll Free 1-800-654-5244 9am-8pm Monday-Saturday
Order Status, Information, Technical Information, call 716-383-8830

NEW REAL DESKTOP

CoCo Max™ III AND



CoCo Max III is absolutely the best drawing package available for the CoCo 3, and it does more than just let you draw. **CoCo Max III** includes animation, text, color mixing and more features than you would think possible. It combines incredible speed with dazzling graphics and it is a joy to use even its most powerful features.

Pictures, graphs, flyers, cards, signs, school projects, labels, buttons and anything else you might dream of creating is now possible with **CoCo Max III.** Is it any wonder that the majority of CoCo Gallery pictures in the last five months were created with **CoCo Max?**

Thousands of CoCo users have found that you don't have to be an artist to have fun with **CoCo Max.** You'll wonder why you waited so long to get the incredible **CoCo Max III.**

CoCo Max III is the best because it includes:

– a huge picture area (*two* full hi-res 320x192 screens) – a large editing window – Zoom mode for detail work – 28 drawing tools which you just point and click on – shrink and stretch – rotation at any angle (1.5 degree steps) – 512K memory support (*all* features work with 128K too) – an Undo feature to correct mistakes – you can even Undo an "Undo" – Animation – special effects – color sequencing (8 colors, variable speed) – thirteen fonts (more available) – each font has eight different sizes – five style options (bold, italic, 3D, etc.) for thousands of font/size/style combination possibilities. – the CoCo Show "slide show" program – color editing of patterns – automatic pattern alignment – prints in single and double size – smart lasso (move text over a background...) – advanced tools: arc, ray, cube, etc. – select 16 of the 64 colors (all 64 colors are displayed at once for selection!) – picture converter (CoCo Max II, MGE, BASIC) – extensive prompting – "glyphic" clipbook of rubber stamps – double click shortcuts – color mixing (additive/subtractive/none) – money back guarantee – sophisticated data compression saves disk space – pull down menus (no commands to remember) – forty paintbrush shapes – two color lettering – spray can – scrapbooks of pictures – error free – Y-cable or multipack not required – high speed hi-res interface included (plugs into joystick port) – disk is not copy protected – amazing "flowbrush" – RGB and composite monitor support – replace color – printing on black and white printers in five shades of gray – full color printing with optional drivers for the NX-1000 Rainbow and CGP220 – entirely rewritten for the CoCo 3

> There are no limits to what you can do with this fabulous program. Speed, ease, animation, power and color, all in one package. **CoCo Max III** is the ultimate program for the CoCo 3. –Rainbow review 4/88

CoCo Max III: $79.95

Max-10 owners: deduct $10

System Requirements:
CoCo 3 disk system and a Joystick or Mouse

Printer drivers included:
IBM/Epson and compatibles, GEMINI, DMP105/106/130,OKI182/192, CGP220 (B&W), DMP110, DMP200

Color printer drivers (prints 125 different colors) Star NX-1000, CGP-220, or Okimate 20 each **$19.95**

For all CoCo Max Versions

Max Edit Font Editor: A font is a set of characters of a particular style. With Max Edit you can create new fonts or modify the existing ones. **$19.95**

Max Font disks (send for list) each **$19.95**

Max Font Set (95 fonts on 4 disks) **$49.95**

DS69/69B Digitizers: allows you to capture the image from a VCR or video camera and bring it into your computer. CoCo Max will let you load digitized pictures and modify them.

DS-69 (2 images per second. Requires multipak) **$99.95**

DS-69B (8 images/second) **$149.95**

CoCo 1 & 2 Owners Still Available:

(See previous ads or write for information)

CoCo Max II (works on all disk CoCos) **$69.95**

CoCo Max Tape (CoCo 1 & 2 only) **$59.95**

Y-Cable **$24.95**

CoCo Max II Picture Disk Set set of 3 disks: **$29.95**

Guaranteed Satisfaction

Use CoCo Max or Max-10 for a full month. If you are not delighted with either of them, we will refund every penny.

COLORWARE

A division of Sigma Industries, Inc.

TO ORDER

(203) 656-1806 MON-FRI 9 to 5 EST

Visa or Mastercard accepted. C.O.D. orders $3 extra

Check or M.O. to: Colorware, 242-W West Ave, Darien CT 06820

Add $3 per order for shipping ($5 to Canada, 10% to overseas)

CT residents add 7.5% sales tax

PUBLISHING

COLORWARE

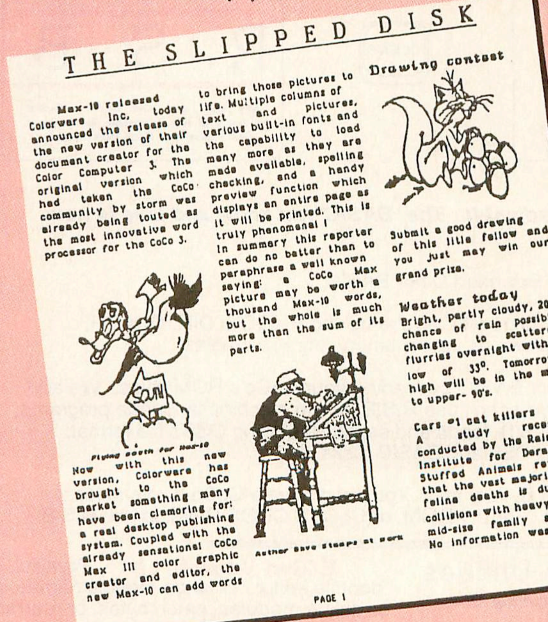
Max-10™

THE DAZZLING WORD PROCESSOR

You probably already have a word processor, and you probably wish it had these features:

- Fully menu driven (CoCo Max style) with point and click marking of text. You don't need the arrow keys!
- True WYSIWYG (What You See Is What You Get) including variable size fonts, styles (bold, italics, etc.) and graphics.
- Can print multiple columns on a page.
- Not limited by printer capabilities: fonts up to 24 points (1/3") high, superscripts, small print, etc.
- Fully integrated spelling checker (incredibly fast), no need to exit program to check spelling.
- Graphics can be imported from just about anything (CoCo Max; MGE; BASIC; even Macintosh pictures from a BBS) and resized to fit your document.
- Full screen preview including graphics.

Max-10 has all these unique features, plus all the features you are used to in your current word processor. Even with all this, you don't give up anything. **Max-10** is easier to use, more intuitive, faster and more powerful than anything else. It's not just a word processor, it's a desktop publisher.



THE SLIPPED DISK

Max-10 released
Colorware Inc, today announced the release of the new version of their document creator for the Color Computer 3. The original version which had taken the CoCo community by storm was already being touted as the most innovative word processor for the CoCo 3.

Flying south for Max-10
Now with this new version, Colorware has brought to the CoCo market something many have been clamoring for: a real desktop publishing system. Coupled with the already sensational CoCo Max III color graphic creator and editor, the new Max-10 can add words to bring those pictures to life. Multiple columns of text and pictures, various built-in fonts and the capability to load many more as they are made available, spelling checking, and a handy preview function which displays an entire page as it will be printed. This is truly phenomenal !
In summary this reporter can do no better than to paraphrase a well known saying: a CoCo Max picture may be worth a thousand Max-10 words, but the whole is much more than the sum of its parts.

Author Dave Stamps at work

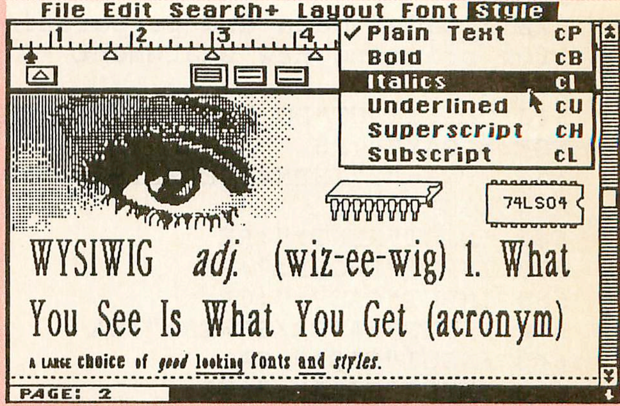
Drawing contest
Submit a good drawing of this litle fellow and you just may win our grand prize.

Weather today
Bright, partly cloudy, 20% chance of rain possibly changing to scattered flurries overnight with a low of 33°. Tomorrow's high will be in the mid- to upper- 90's.

Cars #1 cat killers
A study recently conducted by the Rainbow Institute for Deranged Stuffed Animals reveals that the vast majority of feline deaths is due to collisions with heavy mid-size family sedans. No information was made

PAGE 1

Max-10: $79.95
CoCo Max III owners: deduct $10
Max-10 requires a CoCo 3, at least 1 disk, & joystick or mouse
Printer drivers included: IBM/Epson and compatibles; DMP 105, DMP106, DMP130; CGP220 (B&W); Gemini/Star



WYSIWIG *adj.* (wiz-ee-wig) 1. What You See Is What You Get (acronym)

A LARGE choice of *good* looking fonts and *styles.*

Some of the many features of **Max-10:**
- Blinding speed - printing in multiple columns - online dictionary - spell checking - graphics can be mixed with text - full justification of proportionally sized characters - bold, italic, underline superscript and subscript type styles - superb file support, just point and click - "Undo" lets you correct mistakes - easy to use, no commands to remember - any graphics program can be used - pictures can be shrunk or stretched to fit - right and left alignment - centering - variable line spacing - page numbering - current page number displayed on the screen - variable tab stops - left and right margins - tabs and margins can vary in the same document - cut and paste text and graphics anywhere in the file - page break shows on the screen - pull down menus are quick and simple to use - lightning fast access to any point in the document with the scroll box - twenty fonts (styles and sizes), more available - any number of character sizes and styles can be mixed on the same line - up to more than 120 characters per line, depending on font size, style and letters - headers and footers, even with graphics - file compatibility with other word processors - right, left, bottom and top margins - word wrap - set starting page - type ahead - key repeat - key click - scroll up and down - ASCII file output for compatibility - disk directory - kill files- block cut, copy and move - global search and replace - paragraph indent - clipboard - merge - show file (on disk) - free memory display - page count - paragraph count - word count - graphics can be resized and moved - multiple fonts - error recovery - true lowercase - 512K memory support (all features work with 128K too) - complete point and click cursor control - moving, clearing and changing blocks of text is ridiculously easy, just point and click at each end of the text block - onscreen ruler - preview file before loading - search and replace - disk is not copy protected - more than 35 pages of text

CoCo Max III and Max-10 Perfect Together

You do not *need* **CoCo Max III** to insert and print graphics in **Max-10**. Max-10 works with any graphics creation program, and you can also use graphics downloaded from bulletin boards.

Similarly, you do not *need* **Max-10** to create graphics with text in **CoCo Max III**. There are tremendous lettering capabilities in **CoCo Max III**, with its many fonts, styles, and sizes.

Together **Max-10** and **CoCo Max III** are an unbeatable combination. This desktop publishing system is better than anything you've ever seen on a CoCo. We are so confident that you will use, and enjoy using the two software packages, that we offer an unconditional money back guarantee. Stop wasting your time and effort using inferior or obsolete products. Move up to the new generation of CoCo software now.

```
490 INPUT"ANOTHER CHANGE  Y/N";R
$:IFR$="Y"THEN410ELSE500
500 GOTO230
510 '
520 'loaded data and preparation
 for printing new statement
530 Z=0
540 CLS:INPUT"DO YOU WANT TO CHA
NGE % PAYS";R$
550 IFR$="Y"THEN410ELSEIFR$="N"T
HEN560ELSE540
560 INPUT"RENT:";RE
570 INPUT"PHONE:";PH
580 INPUT"CATV:";CA
590 INPUT"WATER/SEWER:";WA
600 INPUT"GAS:";GA
610 INPUT"TRASH:";TR
620 INPUT"ELECTRICITY:";KU
630 LINEINPUT"DATE BILL IS DUE "
;DD$
640 Z=0
650 Z=Z+1
660 IFZ>6THEN700
670 IF NA$(Z)="" THEN 690
680 CLS:PRINTNA$(Z):INPUT"AMOUNT
 PAID:";PD(Z)
690 GOTO650
700 'printing statement
710 Z=0
720 Z=Z+1:IFZ>6THEN1450
730 IFNA$(Z)=""THEN1440
740 PRINTNA$(Z);:INPUT" PRINTOUT
  Y/N";HC$
750 IFHC$="Y"THENJ=(-2)ELSEJ=0
760 PRINT#J,NA$(Z)
770 PRINT#J,"STATEMENT DUE DATE
IS: "DD$
780 PRINT#J,"RENT";
790 PRINT#J,TAB(23);
800 PRINT#J,USING"$$,####.##";((
RC(Z)*RE)/100)
810 PRINT#J,"PHONE";
820 PRINT#J,TAB(26);
830 PRINT#J,USING"$$##.##";((PC(
Z)*PH)/100)
840 PRINT#J,"CATV";
850 PRINT#J,TAB(25);
860 PRINT#J,USING"$$###.##";((CC
(Z)*CA)/100)
870 PRINT#J,"WATER/SEWER ";:PRIN
T#J,TAB(25);:PRINT#J,USING"$$###
.##";((WA(Z)*WA)/100)
880 PRINT#J,"GAS ";:PRINT#J,TAB(
25);:PRINT#J,USING"$$###.##";((G
A(Z)*GA)/100)
890 PRINT#J,"TRASH";:PRINT#J,TAB
(26);:PRINT#J,USING"$$##.##";((S
C(Z)*TR)/100)
```

Real BASIC for OS9! Only $39.95

OS-9 LEVEL TWO VR. 02.00.01
COPYRIGHT 1986 BY
MICROWARE SYSTEMS CORP.
LICENSED TO TANDY CORP.
ALL RIGHTS RESERVED

July 11, 1988 14:37:30

Shell

OS9: xmode /w5 type=0
OS9: iniz /w5
OS9: rsb <>>>/w5 &
&007

CLEAR

RSB COPR. 1988 BURKE & BURKE
DISK EXTENDED COLOR BASIC 2.1
COPR. 1982, 1986 BY TANDY
UNDER LICENSE FROM MICROSOFT
AND MICROWARE SYSTEMS CORP.

OK
LOAD "DEMO"
OK
LIST
10 PMODE 4:SCREEN 1,1
20 X=RND(256)-1:Y=RND(192)-1
30 XS=RND(256-X)-1:YS=RND(192-Y)-1
40 LINE (X,Y)-(X+XS,Y+YS),PSET,BF

CLEAR

Welcome to . . .
R. S. B.
See R.S.B. and other Burke & Burke products at the Princeton Rainbowfest. Don't miss our Hard Disk Seminar!

There is nothing wrong with your Color Computer. Do not attempt to adjust it. The BASIC you know and love is now running under Level 2 OS9 windows. You are in command.

Burke & Burke is proud to present another OS9 programming language: Disk Extended Color BASIC.

You've probably heard of this language. It's the one your Color Computer was born with. We're talking PMODE, DIR, COLOR, RENUM, PLAY and other familiar words. Under Level 2 OS9. In as many windows as your memory lets you create.

Our R.S.B. software creates an OS9-compatible version of Disk Extended Color BASIC by reading your CoCo's ROM chips. We add new software for OS9-style graphics, sound, printer, and disk I/O. Of course, you can't use R.S.B. to run machine language programs, and some BASIC commands work slightly differently under R.S.B. Although R.S.B. loads and saves files using OS9's file format, we've also included utilities to transfer BASIC programs and data files between OS9 and BASIC disks.

Did you know that Level 2 OS9 always runs at double-speed? This makes R.S.B. very fast. You must have a CoCo 3 with at least 128K RAM, and a floppy controller with Disk Extended Color BASIC 1.0, 1.1, 2.0, or 2.1 ROM, or CoCo 3 CDOS ROM, to use R.S.B.

Wild & MV Version 2.1 Use "wildcards" with most OS9 commands, or rearrange your directory tree. Features recursive directory searches. A hard disk must! **$19.95**

Check out these OS9 Utilities
Tools to let you spend less time fighting OS9, and more time using it.

EZGen Version 1.04 Powerful OS9 bootfile editor. Change module names, add or delete modules, patch bytes, or rearrange modules. Works on other files, too. **$19.95**

Burke & Burke
P.O. Box 1283 Palatine, IL 60078-1283 (312) 397-2898

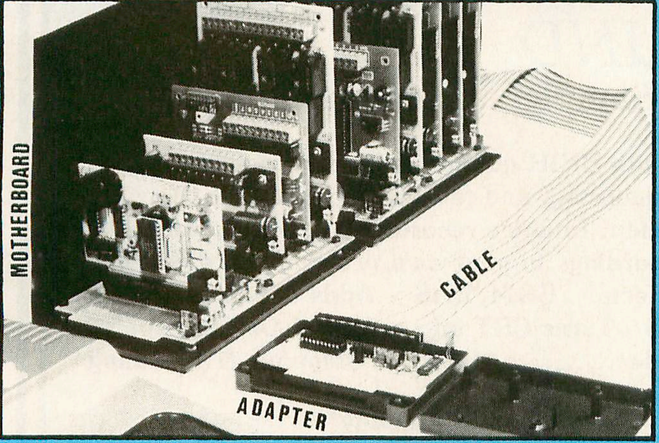
VISA

ILLINOIS RESIDENTS PLEASE ADD 7% SALES TAX. COD's add $2.20. Shipping (within the USA) $2.00 per CoCo XT; $1.50 per disk or ROM. Please allow 2 weeks for delivery (overnight delivery also available for in-stock items). Telephone orders accepted (312) 397-2898.

RAINBOW CERTIFICATION SEAL

The Amazing A-BUS

NEW



An A-BUS system with two Motherboards
A-BUS adapter in foreground

The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card RE-140: $129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card RE-156: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm CL-144: $89

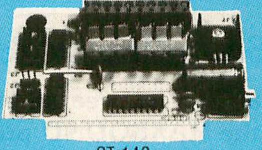
Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

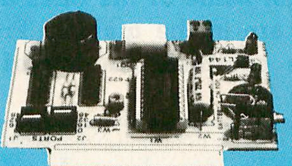
Touch Tone® Decoder PH-145: $79

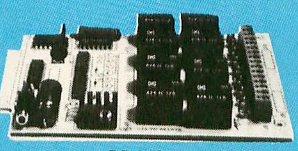
Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

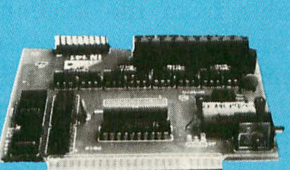
A-BUS Prototyping Card PR-152: $15

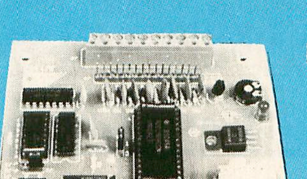
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s


ST-143


CL-144


RE-140


IN-141


AD-142

Smart Stepper Controller SC-149: $299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option RC-121: $49

To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option PD-123: $89

Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option BB-122: $19

For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver ST-143: $79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143: **PA-181: $99**

Stepper Motors MO-103: $15 or 4 for $39

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot.	AR-133...$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus"	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3,4,4D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...$49
TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot. Multipak, or Y-cable.	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: CA-162: $34

A-BUS Motherboard MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

- The A-BUS is not a replacement for the Multi-pak

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
CT & NY residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

ALPHA Products
a Sigma Industries Company
242-W West Avenue, Darien, CT 06820

Technical info:	(203) 656-1806
Orders only Except in CT	800 221-0916
Connecticut orders:	(203) 348-9436

All lines open weekdays 9 to 5 Eastern time

<<< GIMMESOFT >>>

A new generation of Color Computer products

MAXSOUND

A High Quality Digital Audio Sampler and Sequencer

Turn your CoCo III into a REAL digital audio sampler with HIGH quality audio reproduction. Easily add exotic effects, ECHO, stuttering, speed shifting, sequencing, and reverse audio to BASIC or ML programs or GRAPHICS! Now includes Data Compression. Imagine recording any Voice, Music, or Sound effect and being able to use these DIGITAL recordings in your own programs! 3 disk sides includes: INTERFACT/BIN - ML driver for sound effects. G&M/BAS - Adds sound effects to Graphics. SHOWTIME and DEMO disks. SCOPE/BAS - Turns CRT into a Digital Oscilloscope to look at MAXSOUND waveforms. Version 3.0 upgrade .... $6.95 + Shipping & Handling

"*Maxsound*...bringing a new era to the CoCo Community"
-Cray Augsburg, June '88 Rainbow Review

CALL TO HEAR 'OVER THE PHONE' DEMO (128k or 512k CoCo III only) $59.95

NEW

Maxsound Soundtracks & Graphics

These exciting disks are samples of what can be created with MAXSOUND and CoCo Max III! Some work on 128k, some work without the MAXSOUND program and some are 512k 4 disk sides of unbelievable sounds and graphics! Just some of the titles are: Airwolf, Star Trek, Knight Rider, Warrior King Demo, Probe, and more are in the making! Prices range from just $5.95 to $9.95
Call or write for a complete catalog of titles available!

V-Term Terminal Emulator

Communicate with VAX, UNIX, Mainframe, and BBS Systems!

FEATURES:

- -VT-100, VT-52, Vidtex (includes RLE graphics display), and standard CRT emulations.
- -Developed and tested on a UNIX system using the EMACS and VI full-screen editors.
- -All 128 ASCII characters accessible from the keyboard.
- -Uses a high-resolution graphics screen to implement a highly readable 80-column screen.
- -Menus can be operated concurrently with other terminal functions. (Disk Basic!)
- -Full 28 line by 80 column screen, with 3 bottom lines protected for menus.
- -Serial port up to 2400 baud, RS-232 Pak up to 9600 baud, DCModem Pak at 300 baud.
- -XModem, XModem-CRC, Y-Modem, and ASCII file transfers directly to disk or memory.
- -Prints disk or buffer files with settable margins, baud rate and word wrap.
- -Full 128k or 512k support with a RAMDISK like buffer. Monochrome monitor support.
- -Capture buffer, Snapshot, Conference mode, 35/40/80 Tracks, and over 56 pages of docs!

Version 02.00.00 upgrade ...... $6.95 + S&H   Disk (128k or 512k CoCo III only) $39.95

4463

Toll Free   1-800-441-GIME   Order Line

Technical assistance: 7pm to 9pm
Orders: 9am to 9pm Eastern time
On-line orders and up to date information: Delphi's CoCo Sig

GIMMESOFT
P.O. Box 421
Perry Hall, MD 21128
301-256-7558 or 301-256-2953

Add $3.00 for shipping and handling
Add $2.50 for COD (USA only)
MD residents add 5% sales tax
VISA/MC/Check/Money Order/COD

229.95
7.95
19.95
57.85
S+H 3
60.85

VISA

<<< GIMMESOFT >>>

MasterCard

A new generation of Color Computer products

GRAPHICS-25

(512k CoCo III only) **Great with MAXSOUND and/or CoCo Max III!** Utilize the FULL 512k memory range of your CoCo III from BASIC for graphics! Create up to 25 ONBOARD HIRES SCREENS! Six new BASIC commands allow instant display switching while secretly drawing other screens. Save and load screens to and from disk. Copy one screen to another. Fast Graphics action, Smooth animation, and 100% Machine Language code. Requires DECB 1.0, DECB 1.1, or FKEYS III. Complete with documentation. Disk $24.95

NEW

MAX-10

(CoCo III only) The dazzling Word Processor and document creator for the CoCo III! MAX-10 is the perfect partner for CoCo MAX III! Mix graphics and text to get great looking newsletters, flyers, ect... Includes Spelling checker! Requires Joystick. (CoCo Max III owners deduct $10) Disk $79.95

CoCo Max III

(CoCo III only) See April '88 review. Built in Animation! / Amazing Color Sequencing!!! Comes with Hi-Res Interface, MINILOAD/BAS, Demo Disk, CoCo Show Pgm. Requires Joystick or mouse. Sale $74.95

MULTI-LABEL III

(CoCo III only) See July '87 review. An easy to use, versatile label creating program including many new CoCo III features. Print multiple fonts on each label! This one's a MUST for the CoCo III!! Disk $16.95

FKEYS III

(CoCo I/II/III) See April '87 review. A user friendly, programmable function key utility that creates up to 20 function keys. EDITOR, DOS mods, Single or Double sided, 35/40 tracks, DISABLE, and it's EPROMable!. Disk .. $19.95

SIXDRIVE

(CoCo I/II/III) This machine language utility modifies DECB 1.0, 1.1, FKEYS III, or ADOS to allow the use of 3 double-sided drives (or 2 D/S drives and **J&R's RAMDISKS**) as 6 S/S drives. Disk $16.95

AUTO DIM

(CoCo III only) See Jan. '88 review. This hardware device protects your monitor, or TV from IMAGE BURN after a few minutes of inactivity from your keyboard. Illustrated and easy to install. Hardware .... $29.95 X

MPI-CoCo Locking Plate

(CoCo III only) **Now 2 styles** Protects your CoCo III and Multi Pak Interface from destroying each other! Please specify MPI number 26-3024 or 26-3124 when ordering! Sale .... $7.95 X

NEW

Warrior King

(CoCo III only) Become Rastann, Warrior King, on a quest to regain his rightful crown hidden deep within his sinister land. Battle monsters, gain magic & weapons, and travel thru harsh wilderness & dark castle dungeons in this medieval realm. From the creator of Kung-Fu Dude comes this awesome arcade game for the CoCo III! Uses the most detailed 320 x 200 16 color graphics & high speed ML code to vault you into a world of fantasy! Dare ye challange the many perils ahead to become Warrior King? Requires 128k CoCo III, Disk drive, and Joystick $29.95

HALL OF THE KING TRILOGY

(CoCo I/II/III) See June '86 & Nov '87 reviews. The epic adventure is back! The largest adventure campaign ever seen for the CoCo is again available. A total of 6 DISK SIDES of intense graphics adventure will have you playing for weeks! Each section is a 2 disk stand alone adventure, but all 3 together form an epic saga! Quest for the legendary earthstone in the ancient dwelling of the dwarfs while you enjoy the classic graphics that made this trilogy famous! Each adventure can be purchased separately for only $29.95, the lowest price ever, or you can SAVE and purchase the entire set for only $74.95. Requires 64k, Disk drive, (and composite monitor for the CoCo III). Please specify HALL of the King I, II, or III .... $29.95 each or the entire 6 DISK Trilogy for only $74.95

In Quest of the Star Lord

(CoCo III only) See Aug '88 review. This is **THE** graphics adventure for the CoCo III! Unparalled 320 x 200 animated graphics will leave you gasping for more! You quest for the Phoenix Crossbow in this post-holocaust world of science and fantasy. Full **4 Disk sides** of mind loving adventure! Requires 128k CoCo III and Disk drive. **HINT SHEET** .... $3.95 (+ $1.00 S&H by itself) Disk $34.95

KUNG-FU DUDE

(CoCo I/II/III) See Feb. '88 review. An exciting arcade game. The **BEST** karate game ever for the CoCo! Destroy opponents and evade obstacles as you grow even closer to your ultimate objective! Spectacular graphics, sound effects, and animation! Requires 64k, Disk drive, and Joystick. Now displays color on CM8. Disk $24.95

PYRAMIX

(CoCo III only) See Dec. '87 review. Brilliant colors, sharp graphics, and hot action in this 100% ML arcade game. You'll enjoy hopping Kubix around the pyramid, avoiding Kaderf, Smack, Smuck, & the Death Square! Disk .. $19.95 X

Ordered these 3, 27 Sept (1600)
CHG to M/C

NEW

AD&D Character's Companion

(CoCo I/II/III) This great timesaving utility helps create compatible AD&D characters. Includes dice rolling routine, pick ability, race & class. Buy from the Players Handbook, magic items & spell materials. Save, load, and print character info. 3 Disk sides $24.95

White Fire of Eternity

(CoCo I/II/III) See Dec '86 review. Enter the era of monsters & magic. Search for the legendary power of White Fire throughout the Forbidden Wood & Dark Caverns in this 64k animated adventure! Disk..$19.95

Champion

(CoCo I/II/III) See May '87 review. Become a superhero in this action adventure! Disk..$19.95

Dragon Blade

(CoCo I/II/III) See Nov '86 review. Slay evil dragon in this 64k animated adventure! Disk..$19.95

```
900 PRINT#J,"ELECTRICITY";
910 PRINT#J,TAB(23);
920 PRINT#J,USING"$$,####.##";(K
U*(AC(Z)/100))
930 PRINT#J,"TOTAL ";
940 PRINT#J,TAB(23);
950 X(Z)=RC(Z)*RE/100
960 W(Z)=PC(Z)*PH/100
970 V(Z)=CC(Z)*CA/100
980 U(Z)=KU*(AC(Z))/100
990 L(Z)=WA(Z)*WA/100
1000 M(Z)=GA(Z)*GA/100
1010 O(Z)=SC(Z)*TR/100
1020 PRINT#J,USING"$$,####.##";(
X(Z)+W(Z)+V(Z)+U(Z)+L(Z)+M(Z)+O(
Z))
1030 T(Z)=X(Z)+W(Z)+V(Z)+U(Z)+L(
Z)+M(Z)+O(Z)
1040 PRINT#J,"":PRINT#J,"UNPAID
FROM LAST BILL";:PRINT#J,TAB(25)
;:PRINT#J,USING"$$###.##";(BB(Z)
);:IF BB(Z)<0THENPRINT#J," CREDI
T"ELSEPRINT#J," "
1050 PRINT#J,"":PRINT#J,"PAYMENT
";
1060 PRINT#J,TAB(23);
1070 PRINT#J,USING"$$,####.##";P
D(Z)
1080 PRINT#J,"":PRINT#J,"TOTAL N
OW DUE";
1090 PRINT#J,TAB(23);
1100 BA(Z)=(T(Z))-(PD(Z))+(BB(Z)
)
1110 BB(Z)=BA(Z)
1120 PRINT#J,USING"$$,####.##";(
BA(Z));
1130 IF (BA(Z))>0THENPRINT#J," N
OW DUE"
1140 IF (BA(Z))<0THENPRINT#J," C
REDIT"
1150 PRINT#J,""
1160 PRINT#J,NA$(Z)" TO DATE TOT
ALS"
1170 RT(Z)=RT(Z)+X(Z)
1180 PR(Z)=PR(Z)+W(Z)
1190 CT(Z)=CT(Z)+V(Z)
1200 UT(Z)=UT(Z)+U(Z)
1210 PT(Z)=PT(Z)+PD(Z)
1220 F(Z)=F(Z)+L(Z)
1230 G(Z)=G(Z)+M(Z)
1240 H(Z)=H(Z)+O(Z)
1250 IFHC$<>"Y"THEN720
1260 PRINT#J,TAB(2)"PAYMENTS";
1270 PRINT#J,TAB(16)"RENT";
1280 PRINT#J,TAB(25)"PHONE";
1290 PRINT#J,TAB(36)"CATV";
1300 PRINT#J,TAB(42)"ELECTRIC";
1310 PRINT#J,TAB(55)"WATER";
1320 PRINT#J,TAB(67)"GAS";
```

```
1330 PRINT#J,TAB(75)"TRASH"
1340 PRINT#J,USING"$$,####.##'
PT(Z));
1350 PRINT#J,TAB(10);:PRINT#J,
ING"$$,####.##";(RT(Z));
1360 PRINT#J,TAB(19);:PRINT#J,
ING"$$,####.##";(PR(Z));
1370 PRINT#J,TAB(26);:PRINT#J,
ING"$$,####.##";(CT(Z));
1380 PRINT#J,TAB(40);:PRINT#J,
ING"$$,####.##";(UT(Z));
1390 PRINT#J,TAB(49);:PRINT#J,
ING"$$#,###.##";(F(Z));
1400 PRINT#J,TAB(57);:PRINT#J,US
ING"$$#,###.##";(G(Z));
1410 PRINT#J,TAB(65);:PRINT#J,US
ING"$$#,###.##";(H(Z))
1420 PRINT#J,STRING$(80,36)
1430 PRINT#J,"":PRINT#J,""
1440 GOTO720
1450 'save to disk
1460 CLS:INPUT"READY TO SAVE TO
DISK  Y/N";R$:IFR$="Y"THEN1470EL
SEEND
1470 INPUT"LAST THREE LETTERS FO
R PASSCODE";LT$
1480 FP$="MATE"
1490 PC$=FP$+LT$
1500 VERIFYON:INPUT"PRESS <ENTER
> WHEN READY";R$
1510 OPEN "O",#1,PC$
1520 FORZ=1TO6
1530 WRITE#1,NA$(Z),PT(Z),RT(Z),
PR(Z),CT(Z),UT(Z),BB(Z),F(Z),G(Z
),H(Z),RE,PH,CA,AP,WA,GA,TR,RC(Z
),PC(Z),CC(Z),AC(Z),WA(Z),GA(Z),
SC(Z)
1540 NEXTZ
1550 CLOSE#1
1560 INPUT"READY TO DELETE OLD F
ILE  Y/N";RD$:IFRD$="Y"THENINPUT
"NAME OF OLD FILE:";OF$:OF$="MAT
E"+OF$+"/DAT":KILL OF$
1570 END
1580 'load old data from disk
1590 INPUT"ENTER LAST THREE LETT
ERS OF CODE";LC$
1600 EC$="MATE":LE$=EC$+LC$
1610 OPEN"I",#1,LE$
1620 FORZ=1TO6
1630 IFEOF(1)THEN1660
1640 INPUT#1,NA$(Z),PT(Z),RT(Z),
PR(Z),CT(Z),UT(Z),BB(Z),F(Z),G(Z
),H(Z),RE,PH,CA,AP,WA,GA,TR,RC(Z
),PC(Z),CC(Z),AC(Z),WA(Z),GA(Z),
SC(Z)
1650 NEXTZ
1660 CLOSE#1
1670 GOTO520
```

> *"In the beginning there was **VIP Writer** and users saw that it was good..*
> *It was still the best thing around for the CoCo, But it's not the best anymore.*
> *There's a new word processor to claim the crown... VIP Writer III.*
> *Setting the Standard for CoCo 3 Word Processing."*
>
> *–The RAINBOW SEPTEMBER 1988*

VIP WRITER III VS THE COMPETITION

VIP Writer has ALWAYS led the pack with features and now VIP Writer III still leads the way! The chart below illustrates this fact. Telewriter 128 only gives you 48K for text. Why is it called Telewriter 128? Word power 3 gives only 72K! VIP Writer III makes use of over 106K! VIP Writer III is the ONLY CoCo 3 word processor worthy of it's name!

WORD PROCESSOR COMPARISON CHART

CoCo3 with 128K	VIP Writer III	Telewriter 128	Word Power 3
Text Storage	OVER 49,000	48,000	72,000
Print Spooler	YES 57,000	NONE	NONE
Total Storage	**106,000**	48,000	72,000
Spelling Checker	**VIP Speller**	NONE	FREE WARE
Screen Display	32/40/64/80	40/80	80

SCREEN DISPLAY OPTIONS

As the chart above shows - VIP Writer III offers more screen width options -all with 24 lines and actual lower case letters. It uses the CoCo 3's hardware display and double clock speed and is VERY VERY FAST! You can choose fore and background colors from up to 64 different hues. Color can be turned ON or OFF for the best possible display using a color or monochrome monitor or TV set. VIP Writer III has a built in on-line context sensitive help facility which displays command usage in easy to read colored windows.

CUSTOMIZER & PRINTER INSTALLER

VIP Writer III comes with a configuration / printer installation program which lets you customize VIP Writer III to suit your own liking. You can set screen width and colors as well as margins and more. You can also install your own printer and set interface type (serial, parallel or J&M), baud rate, line feeds, etc. Once done, you never have to enter these parameters again! VIP Writer III will load n' go with your custom configuration every time!

TEXT FILE STORAGE

VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII file format. You can use VIP Writer III to even create BASIC programs! There is a 49K text buffer and disk or cassette file linking allowing virtually unlimited text space. VIP Writer III works with up to four disk drives and lets you display disk directories and free space as well as rename or kill disk files. In addition VIP Writer III is 100% compatible with the RGB Computer Systems HARD DISK.

EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead • typamatic key repeat and key beep for flawless text entry • end of line bell • full four way cursor control with scrolling • top of textfile • bottom of textfile • page up • page down • top of screen • bottom of screen • beginning of line • end of line • left one word • right one word • DELETE character, to beginning or end of line, word to the left or right, or entire line • INSERT character or line • LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards • BLOCK copy, move or delete with up to TEN simultaneous block manipulations • TAB key and programmable tab stops • word count • line restore • three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and multiple copy printing.

TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers, page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! Parameters can be altered ANYWHERE within your text file!

PREVIEW PRINT WINDOW

VIP Writer III features an exclusive format window which allows you to preview your document BEFORE PRINTING IT! You are able to move up, down, left and right to see centered and justified text, margins, page breaks, orphan lines etc.

PRINTING

VIP Writer III prints TWICE as fast as any other CoCo word processor! It supports most serial or parallel printers using J&M JFD-CP or Rainbow interface and gives you the ability to select baud rates from 110 to 19,200. *You can imbed printer control codes* anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has TWENTY programmable printer macros which allow you to easily control all of your printers capabilities such as bold, underline, italics and superscript using simple key strokes. Other features include: multiple copy printing • single sheet pause • line feeds.

PRINT SPOOLING

Save up to $150 on a print spooler because VIP Writer III has a built in print spooler with a 57,000 character buffer which allows you to print one document WHILE *you are editing* another. You don't have to wait until your printer is done before starting another job!

SPELLLING CHECKER

VIP Writer III includes VIP Speller AT NO ADDITIONAL COST! VIP Speller checks text for misspelled words and has a 50,000 word dictionary that can be added to or edited.

DOCUMENTATION

VIP Writer III is supplied with a 125 page instruction manual which is well written and includes many examples. The manual has a tutorial and glossary of terms for the beginner as well as a complete index! VIP Writer III includes VIP Speller. DISK $79.95

VIP Writer owners: Upgrade to the VIP Writer III Disk for $49.95 + $3 S/H. Send ORIGINAL disk and $52.95 total.

VIP Database III

VIP Database III features selectable screen displays of 40, 64 or 80 characters by 24 lines with choice of 64 foreground, background, hilite and cursor colors for EASY DATA ENTRY. It uses the CoCo 3's hardware screen and double clock speed to be the FASTEST database available! VIP Database III will handle as many records as will fit on your disks and is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. IN-MEMORY SORT of records is LIGHTNING FAST and provides for easy listing of names, figures, addresses, etc., in ascending or descending alphabetical or numeric order. Records can be searched for specific entries using multiple search criteria. The built-in mail-merge lets you sort and print mailing lists, print form letters, address envelopes - the list is endless. The built-in MATH PACKAGE even performs arithmetic operations and updates other fields. VIP Database III also has a print spooler and report generator with unlimited print format capabilities including embeddable control codes for use with ALL printers. DISK $69.95

VIP Database owners: Upgrade to the VIP Database III for $39.95 + $3 S/H. Send ORIGINAL disk and $42.95 total.

VIP Library
/Writer Database Enhanced

The VIP Library /WDE combines all six popular VIP application programs - VIP Database III, VIP Writer III, VIP Speller, VIP Calc, VIP Terminal and VIP Disk-ZAP - into one program on one disk! The program is called VIP Desktop. From the desktop you have instant access to word processing with a spelling checker always in attendance, data management with mail merge, spreadsheet financial analysis, telecommunications and disk maintenance.* DISK $169.95

VIP Library owners: Upgrade to the VIP Library /WDE for $89.90* + $3 S/H. Send ORIGINAL disk and $92.90 total.

* Future VIP Library upgrades available at reduced cost.

All products run under RSDOS and are not copy protected.

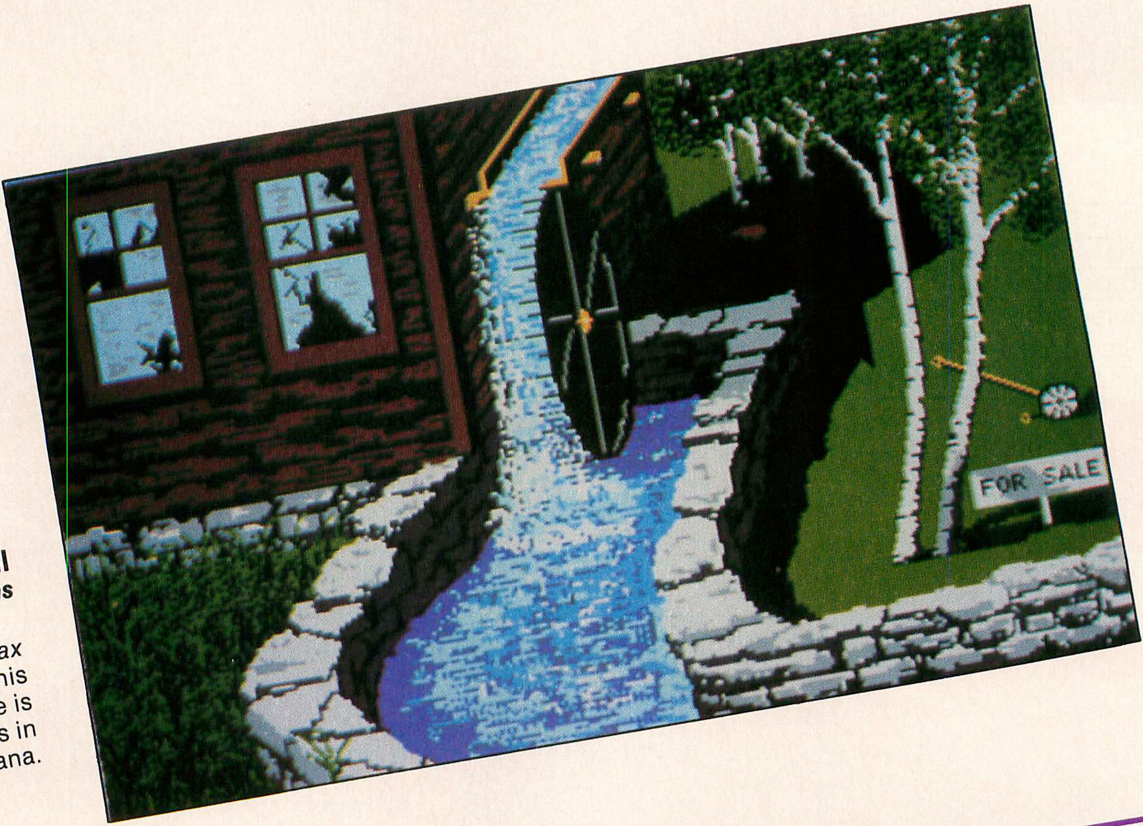
SD ENTERPRISES

☎(503) 663-2865 ✉POB 1233 Gresham, OR 97030

Please add $3 for shipping and handling. Outside continental US add $4 S/H. COD orders add an additional $2.25. Checks allow 3 weeks for delivery. All other orders are shipped the same day.

Telewriter 128 is a trademark of Cognitec. Word Power 3 is a trademark of Microcom Software.

The CoCo Gallery



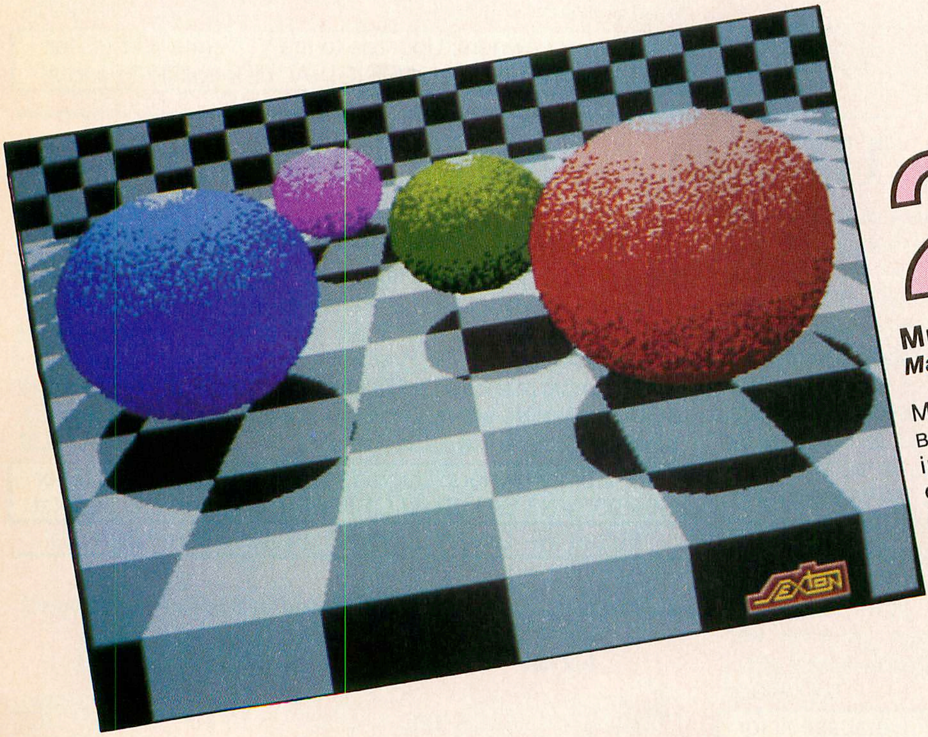
1st

COCO 3

Mill

Gerald E. Adams

Gerald used *CoCo Max III* to illustrate this graphic scene. He is retired and lives in Bremen, Indiana.



2nd

Multichromatic Spheres

Mark Sexton

Mark, of Madera, California, used BASIC and the CoCo 3 for this interesting graphic, then compressed it with an ML program he developed. He is a senior in high school and is fascinated with graphic arts.

SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

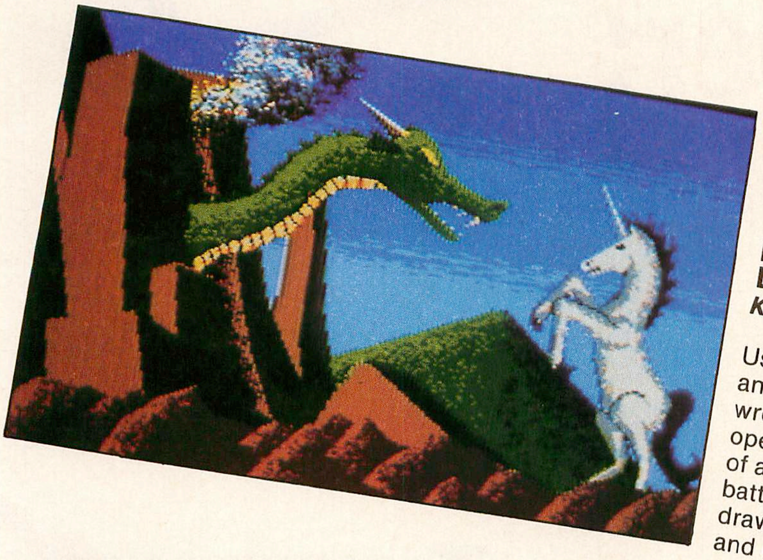
Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer, Curator

We are taking "CoCo Gallery" to RAINBOWfest Princeton! See Page 117 for details.



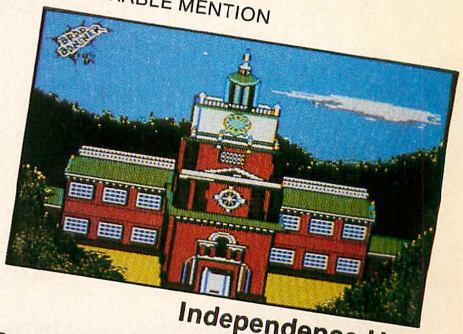
3rd

Dragon's Lair, Dragon Slayer

Keith Schuler

Using the CoCo 3 and a program he wrote, Keith developed this depiction of a mythological battle. He enjoys drawing, swimming and using his CoCo.

HONORABLE MENTION



Independence Hall

Brad Bansner

Brad, of Wyomissing, Pennsylvania, used *Color Max Deluxe* to create this illustration of Independence Hall, located in Philadelphia.

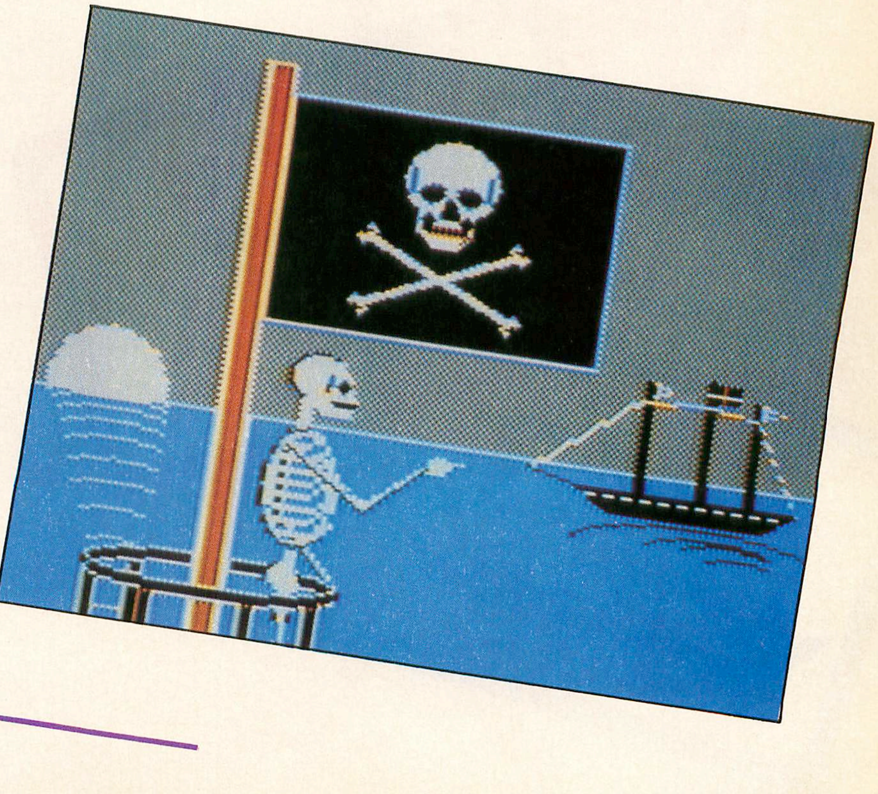
1st

COCO 1 & 2

Pirate

Bill & Bob Flock

BASIC and the CoCo 2 were used to develop this depiction. Brothers Bill and Bob live in Norwalk, Wisconsin, and enjoy working with computers and programming in BASIC.

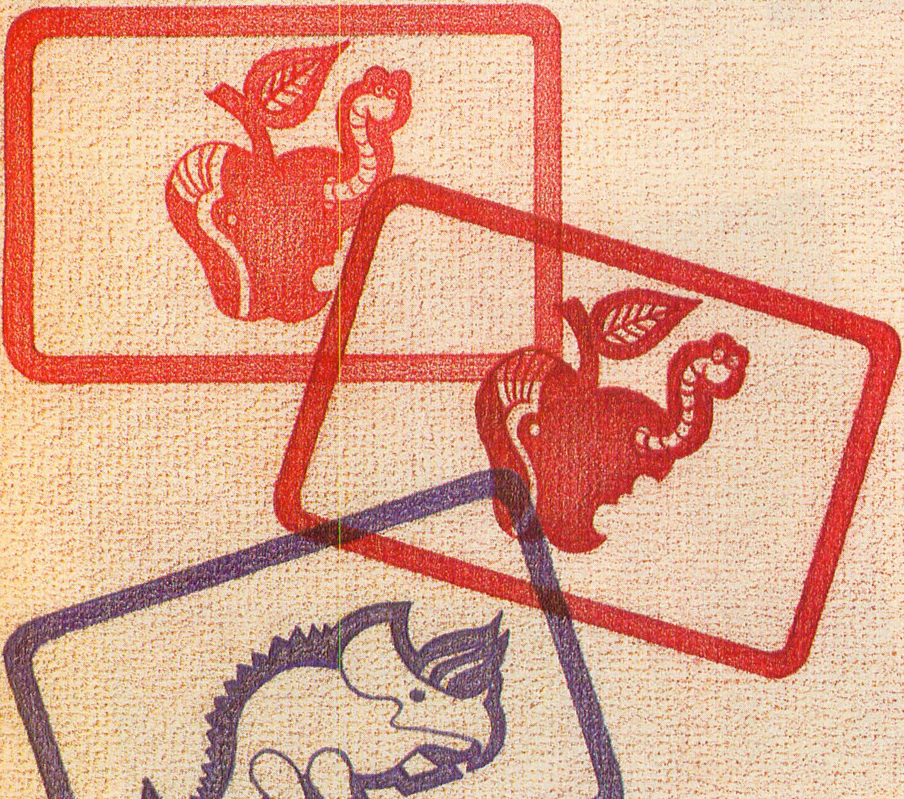


Two new graphics commands for PMODE image manipulation

Super Stamper:

The Elastic Rubber Graphics Stamp

By Jeremy Spiller



Take a graphics picture and stretch it, shrink it, turn it upside down and inside out. Enlarge it, rotate it, skew it and distort it. Print it all over your TV screen as many times as you want. Each time you do, one simple command can make it as large, small, distorted or rotated as you like. *SuperStamper* allows you to do all this.

SuperStamper is a graphics tool for use with PMODE 3 or 4 screens, similar to the GET and PUT statements but with several sizable differences. It is a machine language program that can easily become a part of BASIC in your 64K CoCo 1 or 2, or in your CoCo 3.

SuperStamper adds two new commands to BASIC — SGET and SPUT. They do not replace BASIC's GET and PUT statements, but operate alongside them. They live in high memory and do *not* take up any of the memory BASIC uses for programming and data. Unlike GET and PUT, SGET and SPUT do not require that you dimension an array to store what you SGET; this saves valuable memory for your program.

Jeremy Spiller, a high school senior, has been programming since age 12. He is now selling his programs as GoSub Software.

Telewriter-128™

the Color Computer 3 Word Processor

For over 5 years now, Telewriter has been the #1 Color Computer word processor, both in popularity and in performance. Telewriter's near perfect mix of sophisticated professional features and a very natural user interface, has earned it the highest praise in numerous magazines, and an intensely loyal following among tens of thousands of Color Computer users all over the world.

HISTORY

Throughout the history of the Color Computer, Telewriter has pioneered software breakthroughs that set the standards.

In 1981, it was Telewriter 1.0 that first took the Color Computer's inadequate 32X16 all-uppercase display, and replaced it with a graphics-based 51X24 upper and lowercase display.

A few years later, Telewriter-64 added high density 64X24 and 85X24 displays and access to the full 64K of the newer Color Computers.

THE NEW AGE

Today, Telewriter-64 is recognized as the standard Color Computer word processor. It runs on all Tandy Color Computers — from the original Color Computer 1, to the Color Computer 2, and 3.

But the Color Computer 3 brings a whole new level of power to low cost computing and, so, a new Telewriter is here to put that power to work for you. We call it Telewriter-128.

TELEWRITER-128

You don't mess with a good thing, so Telewriter-128 is still Telewriter-64 at heart. The commands, and the user interface are essentially the same. If you know Telewriter-64, then you already know Telewriter-128. And, if you don't know Telewriter-64, you'll still have an easy time learning and using Telewriter-128.

80 COLUMNS

But there are major differences as well. First, Telewriter-128 uses the Color Computer 3's new 80 column screen display.

This means, simply, that using Telewriter-128 on a low cost Color Computer 3 will look a lot like using a more expensive word processor on a much more expensive IBM PC, PS/2, or clone.

SPEED

Second, Telewriter-128 is lightning fast. Telewriter-64 was fast in its own right, but, by accessing the Color Computer 3's video hardware directly, and by running the machine in double speed mode, Telewriter-128 is able to provide extremely fast scrolling and instant paging — functions whose speed is crucial to serious word processing.

In this department, Telewriter-128 doesn't simply keep up with IBM-based word processors — it generally surpasses them!

EASE

Third, Telewriter-128 adds a host of new features big and small, that make it even easier to use.

Features like: Quick function key access to the editor or the menus — an instant on-line help screen summarizing all Telewriter commands and special characters — an option file where you store your personal set of format and screen settings so you only have to set them once!

Then, there's a quick save feature which allows you to save all your current work without leaving the editor. There's a simple way to cursor through the disk directory and read in a file by just hitting ENTER. And there's more.

NEW POWER

Telewriter-64 always had the power to handle any kind of serious writing, from letters to textbooks. But, here too, Telewriter-128 adds major features.

Like Macros — which let you insert whole words or phrases (even sets of control codes or format commands) into your text, with a single keypress. And every time you power up Telewriter-128, the macro definitions are automatically loaded*, so they're always there.

Then there's a Print Preview feature that shows you, on-screen, the way your printed text will look — with margins, headers, centering, justification, page numbering, and page breaks. This guarantees letter perfect documents every time, and makes tasks like widow/orphan line elimination, a breeze.

TELEWRITER-64 OR TELEWRITER-128

We could go on listing features, but the point is this: If you own a Color Computer, you already have the hardware for the most powerful, low cost word processor in town. All you need now is to add the heart and soul:

Telewriter-64, for the Color Computer 1 and 2, costs $59.95 on disk, $49.95 on cassette.

Telewriter-128 for the Color Computer 3 costs $79.95 on disk, $69.95 on cassette.

To order by Mastercard or Visa call (619) 755-1258 anytime, or send check or money order plus $2 shipping (Californians add 6% sales tax) to:

COGNITEC
704 Nob Ave.
Del Mar, CA 92014

To upgrade from Telewriter-64 to Telewriter-128, return your original disk or cassette with $39.95. (Add $10 if you're also upgrading from cassette to disk. Deduct $10 with proof of Oct '87 - Feb '88, purchase of Telewriter-64.)

> *When I first got Telewriter-64 last year, I was in heaven. I couldn't believe the program's versatility and ease of use.*
> -The RAINBOW, Oct. 1985

TELEWRITER-64 FEATURES: Compatibility with any printer that works with the Color Computer; embedded control codes for underlining, boldface, sub/superscript, variable fonts; format commands for headers, centering, margin and spacing changes anywhere in the document; Format menu to set margins, spacing, page numbering, BAUD rate, lines per page, justification; Chain printing for one shot printing of multi-file documents. Fast, full-screen editor with wordwrap, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, text alignment, tabs, error protection, word and line counter. Insert or delete text anywhere on the screen. Simple, easy to remember commands. Optional ASCII files for compatibility with spell checkers, terminal programs, and BASIC. Load, save, append, partial save files to disk or cassette. Kill, rename and list disk files. Cassette verify and auto-retry on error.

TELEWRITER-128 - ADDITIONAL FEATURES: Print preview from editor; multiple copy print; footers; hanging indents; cursor thru disk directory to load, append, rename and kill files; quick file save from editor; keyclick; key repeat; true block move; 24, 25, or 28 line screen; 40 or 80 column screen; dual speed cursor; on-line help; overstrike mode; word delete; wordwrap at margin; user definable macros; nested macros; instant status window for information on cursor position, word count, etc.; instant function key access to menus or editor; options menu for setting character and screen colors, key repeat and delay rates, definable foreign symbols.

RAINBOW
CERTIFICATION
SEAL

IBM and PS/2 are trademarks of International Business Machines Inc. *disk version only ed, *SuperStamper* remains BASIC until you reset or the computer. It will not hines without Extended r memory less than 64K. works only on PMODE 3 or 4 screens and does not work on the high resolution screens of the Color Computer 3. However, CoCo 3 owners can still use *SuperStamper* on their PMODE 3 or 4 screens (provided they switch to CoCo 2 mode — more on this later).

How It Works

Like the GET and PUT commands, SGET and SPUT allow you to specify a rectangle on your graphics screen for storage. Unlike the GET and PUT commands, however, SGET and SPUT allow you to specify three points instead of two. This turns the rectangle into a true parallelogram.

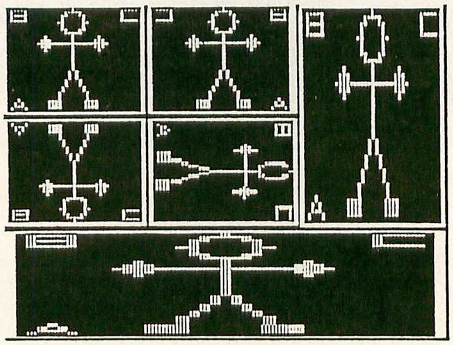
A parallelogram is a four-sided figure in which opposite sides are parallel. Squares and rectangles are special kinds of parallelograms, having right angles at the corners; but the corners don't have to be right angles in order for the opposite sides to remain parallel. By "SGETting" a piece of your graphics screen in a rectangular parallelogram and then "SPUTting" it in a parallelogram of another size, shape and orientation, you can distort, invert, shrink, enlarge or rotate whatever graphic elements were in the original parallelogram.

SuperStamper performs a beautiful mathematical ballet that recalculates the position of every pixel within your SGET parallelogram, and with SPUT, distorts the picture just as if it were made of rubber. The program is made even more versatile by its facility to lengthen or shorten the sides of the parallelogram, thereby enlarging or shrinking the picture.

You can shorten a picture in one dimension while elongating it in the other, giving the image a stretched appearance. Finally, you can rotate your parallelogram so that objects appear right-side-up, upside-down — or any rotational angle in between.

Once you have used the SGET command to specify your graphics parallelogram, you may stamp it all over the screen as many times as you want, using a newly defined parallelogram each time you SPUT it. With this stamping feature, you can draw a small picture in one part of the screen and use that picture to create many screenfuls of striking images. And because SGET and SPUT are compatible with all aspects of BASIC, you can use *SuperStamper* as part of any BASIC graphics program.

SuperStamper allows you to SGET any part of your PMODE 3 or 4 screen up to 256 pixels wide by up to 128 pixels deep. Any attempt to SGET or SPUT with larger numbers will give unexpected results.



Usage Syntax

The syntax for using SGET and SPUT in your BASIC statements is as follows:

```
SGET (AX,AY)-(BX,BY)-(CX,CY)
SPUT (AX,AY)-(BX,BY)-(CX,CY)
```

X specifies the horizontal position of each of the three points that define the parallelogram — a number from 0 to 255; 0 is on the left side of the screen.

Y specifies the vertical position of each of the three points — a number from 0 to 191; 0 is at the top of the screen, and 191 is at the bottom. AX,AY specifies the position of Point A. BX,BY specifies the position of Point B. CX,CY specifies the position of Point C.

Note that you do *not* have to specify an array or an action as you do in the GET and PUT commands. *SuperStamper* uses its own secret array hidden away in high memory, so you won't have to sacrifice any memory that would otherwise be used for your own program.

The SGET command will "lasso" any part of your graphics picture by drawing an imaginary parallelogram around it. The three arguments that follow SGET specify the three points on the screen that define the parallelogram:

SGET (Point A)-(Point B)-(Point C).

The computer always draws four imaginary lines. The first is drawn between points A and B, and the second between points B and C. These two lines define the parallelogram. The other two imaginary lines are drawn opposite and parallel to the first two so as to complete the parallelogram. They meet at imaginary Point D, which is always diagonally across from Point B. (Note that *no* line is drawn between points A and C.)

You may choose any shape parallelogram for "SGETting;" however, in most cases you will probably want to define a rectangle, as it is the easiest shape to keep track of. Once you have defined your SGET parallelogram, the computer copies it into a secret buffer where it is stored in a "standard" form for later stamping with the SPUT command.

SPUT has the same syntax as SGET. The first pair of coordinates following the SPUT define Point A; the second pair define Point B; and the third, Point C. The main thing to remember when using SPUT is that graphics elements that were near any given point when you defined your SGET parallelogram always remain near that point no matter where they are SPUT. For example, let's say you have a picture of a man with his arms and legs outstretched. His right hand is gloved and his left is not. You SGET him by specifying Point A near his right foot (the lower-left corner of the SGET rectangle); Point B near his right hand (the upper-left corner of the rectangle) and Point C near his left hand (the upper-right corner of the rectangle). Now you can stamp him with the SPUT command. If you specify Point A (the first pair of coordinates following the SPUT command) to be the *upper*-left corner of your SPUT rectangle, leaving points B and C to be the lower-left and lower-right corners, respectively, your man will appear upside down and backwards (inverted), just as if he were viewed in a mirror placed under his feet. His left hand now wears the glove instead of his right hand (see the figure for a screen dump of Listing 2's demo).

You can elongate your stick figure by specifying SPUT points farther apart than they were in the original SGET command. You could elongate him right to left while shortening him up and down. You can rotate him by having three points draw a non-vertical line between points A and B, and specifying a line between points B and C at a right angle to the line between points A and B. You can skew him by making Line AB non-vertical, but keeping line BC horizontal. And, of course, you can stamp him with no distortion at all.

Keying In for CoCo 3

Before trying to key in or run *SuperStamper* on a CoCo 3, you must put it into CoCo 2 mode by typing the following lines:

```
10 POKE &HFFDE,0
20 POKE 113,0
30 EXEC 40999
```

Program Organization

Listing 1 is the utility that boots the *SuperStamper* algorithm. It should be saved under the filename `SUPRSTMP .BAS`. Its function is twofold. First, it transfers the ROM into the all-RAM mode and installs the *SuperStamper* algorithm into the BASIC interpreter, giving it the ability to understand the `SGET` and `SPUT` commands. Second, it gives birth to a machine language "clone" of itself that can be saved to disk or tape and later reloaded to perform the same functions, only much faster.

Lines 1000 through 1170 contain the algorithm itself. *Every character in these lines must be correct or* Super-Stamper *will not work.* For this reason, I have included check sums so the computer can tell you if you have made an error. Do not renumber these lines!

The `DATA` *lines do not contain the letter 'O'! They do, however, contain many zeros!* If you get an error message when running the program, check to see if you have included an 'O' instead of a zero. It is helpful to know that these lines contain only the digits 0 through 9 and the letters A through F and that all the lines are the same length except for Line 1170.

The ML Clone

When executed, the ML clone transfers the computer into the all-RAM mode and installs the algorithm. Note that the ML clone is *not* the same program you keyed in; it is created by `SUPRSTMP` and lives in a special place in high memory protected from BASIC by Line 70 (`CLEAR200,&H7E00`). After creating the ML clone, `SUPRSTMP` will prompt you for a save to disk or tape. When you answer the prompt, the clone will be saved as `STAMP.BIN`. Once saved, you may install *SuperStamper* very quickly by loading and executing `STAMP.BIN`. You *must* use the following boot to load and execute:

```
10 CLEAR 200,&H7E00
20 LOADM"STAMP"
  (CLOADM for tape users)
30 EXEC
40 CLEAR 200,&H7FFF
```

Note that you cannot key in or run any program that contains `SPUT` or `SGET` unless you have first installed the *SuperStamper* algorithm by either running `SUPRSTMP` or by executing `STAMP.BIN`. The computer cannot understand the syntax of `SPUT` or `SGET` unless the operating system has been properly modified. The demo is no exception. Therefore, key in `SUPRSTMP` first and create an easily accessible copy of `STAMP.BIN` before beginning work on the demo.

It is important to your understanding of the program that you key in and study Listing 2. The listing is very much a part of the documentation for *Super-Stamper* and a graphic demonstration of what happens when you relocate points A, B and C. It contains examples of how to create mirror images and skewed, stretched, inverted and rotated stampings.

The `REM` statements attached to each `SPUT` line explain what it does. The important thing to note is not the exact location of each point, but the *relative* position of points A, B and C in each `SPUT` statement.

The `SGET` is always done in a rectangle with Point A in the lower-left corner, Point B in the upper-left and C in the upper-right. If your `SPUT` statement places Point A in the lower-right corner, Point B in the upper-right and Point C in the upper-left, you get a mirror image (see Line 540). If you leave Point A at the lower-left, but displace points B and

HELLO/BAS
A DISK DIRECTORY UTILITY by Roy C. Pierce (c) 1988
WHAT WILL HELLO DO

Display Alphabetically Sorted Directory of any Drive. (0-3)
Print a Hardcopy of Sorted Directory w/Date and Disk Name.
Run ANY BASIC Program with Ease.
RUNS ON ANY COCO.
(32K Disk Extended BASIC Required)
Single Key Stroke Commands.
Easy to Read Display.
ALL BASIC so it won't Mess up your System.
SUPER FAST OPERATION.
Reads Any Drive at Will.
Low Disk Overhead - Only 1 Gran.
Easy to Copy to All your Disks, Comes with Handy DISKINIT/ Utility for Autobooting HELLO/BAS.

GOOD GAMES TRIO
Challenging Two Player Games by Roy C. Pierce (c) 1988
ADI OTHELLO CONNECT 5
FAST AND FUN FOR ALL AGES
EASY TO RUN
ALL BASIC COMPLETELY LISTABLE

INDIVIDUAL ORDERS $19.95 U.S. $22.95 CDN.
INTERNATIONAL $22.95 U.S.
BOTH $34.95 U.S. $39.95 CDN.
INT.$39.95 U.S.
SHIPPING & HANDLING INCLUDED
RAINBOW CERTIFICATION SEAL

RCPIERCE SOFTWARE
P.O.BOX 1787,
Main Post Office,
Edmonton, AB. Canada
T5J-2P2
PH: (403) 474-8435

THE PAK IS BACK!
Truly Compatible RS232 interface
NEW FROM
TELEPAK Orion TECHNOLOGIES

No compatibility hassles! Uses standard DB25 cable.
No 1200 baud restriction. Baud rates to 19,200 baud!
Compatible with all RSDOS and OS-9 software that uses the Radio Shack Deluxe RS232 Pack.
PRICED TO FIT YOUR BUDGET!

TELEPAK
For use with Coco 1 or multipack only, taking advantage of their built-in power supplies. 44.95

TELEPAK +
For use with ANY CoCo in any configuration. 49.95
Even with a Y-Cable!

Orion Technologies
P.O. Box 63196
Wichita, Ks. 67203
(316) 946-0440

All orders add 3.00 shpg/hdlg.
C.O.D. additional 3.00
No delay for personal checks.

C to the right, your graphics will be skewed in that direction. The box around the stick figure is 80 pixels wide and 60 pixels high. Note that in some of the lines I have allowed BASIC to add these dimensions right inside the parentheses. The term `(0,65+60)` is the same as `(0,125)`.

You can use any numerical expression *or variable* inside the parentheses.

Program Quirks

Keep in mind that you are working with digitalized images whose resolution depends upon the exact size and location of each pixel. Whenever you shrink an image using *SuperStamper*, you will lose some detail. Because each pixel is longer up and down than it is right to left, rotations will produce some distortion that you may be able to minimize by adjusting the exact size and position of each `SPUT` point.

You may be surprised at some of your results. When you skew a picture, you may find that it wraps around to the opposite side of the screen or is partly off the screen because you inadvertently placed Point D (the last corner of the parallelogram that you *didn't* specify in your `SPUT` statement) outside the 256-by-128 pixel limit.

(Questions or comments regarding these programs may be directed to the author at P.O. Box 1094, Townsend, MA 01469. Please enclose an SASE when writing for a reply.) ☐

180 1
330 56
1080 34
END 250

Listing 1: `SUPRSTMP`

```
5 REM COCO 3 USERS MUST SWITCH
     TO COCO 2 MODE BEFORE KEY-
     ING IN OR RUNNING THIS
     PROGRAM. TYPE
     POKE&HFFDE,0:POKE113,0:
     EXEC&HA027
10 REM ***************************
20 REM *      SUPERSTAMPER       *
30 REM *           BY            *
40 REM *     JEREMY SPILLER      *
50 REM *     COPYRIGHT 1988      *
60 REM ***************************
70 CLEAR 1000,&H7E00
80 PO=&H7E00
90 FOR X=17 TO 0 STEP -1
100 CLS:PRINT "COUNTDOWN =";X
110 PRINT "LINE";(17-X)*10+1000
120 READ A$:CS=0
130 FOR Y=1 TO LEN(A$)-3 STEP 2:
A=VAL("&H"+MID$(A$,Y,2)):POKE PO
,A:PO=PO+1:CS=CS+A:NEXT Y
140 IF RIGHT$(HEX$(CS),3)<>RIGHT
$(A$,3) THEN PRINT"ERROR":STOP
150 NEXT X
160 EXEC &H7E00
170 CLS:PRINT"SUPERSTAMPER HAS N
OW BEEN IN-   STALLED AS A PART
OF BASIC":PRINT
180 PRINT"IT HAS ALSO BEEN STORE
D IN       MEMORY AS A MACHINE LA
NGUAGE      CLONE WHICH CAN BE SAV
ED TO DISKOR TAPE.  ONCE SAVED,
THIS CLONEMAY BE USED TO INSTALL
 SUPER-    STAMPER WITHOUT RUNNIN
G          SUPRSTMP.BAS.
190 PRINT:LINE INPUT"PLEASE PREP
ARE DEVICE AND PRESS (D)ISK OR (
T)APE AND (ENTER)   WHEN READY.
 YOU MAY ALSO PRESS   (BREAK) TO
QUIT.";A$
200 IF A$="D" THEN SAVEM"STAMP.B
IN",&H7E00,&H7FB8,&H7E00 ELSE IF
 A$="T" THEN GOSUB 330 ELSE 180
210 PRINT
220 CLS
230 PRINT"TO INSTALL SUPER STAMP
, PLACE   THIS AT THE BEGINING O
F YOUR    PROGRAMS:"
240 PRINT
250 PRINT"10 CLEAR 200,&H7E00"
260 PRINT"20 ";
270 IF A$="T" THEN PRINT"C";
280 PRINT "LOADM"+CHR$(34);
290 PRINT"STAMP"+CHR$(34)
300 PRINT "30 EXEC"
310 PRINT "40 CLEAR 200,&H7FFF"
320 CLEAR 1000,&H7FFF:END
330 CSAVEM"STAMP.BIN",&H7E00,&H7
FB8,&H7E00:RETURN
340 REM THE FOLLOWING DATA
    CONTAINS ONLY ZEROS, NO
    LETTER "OH"'S
1000 DATA 1A508E8000A6846384A184
2703638439 7FFFDEEC847FFFDFEDD0E
1010 DATA 818CE00025F18E013E8602
A780CCE015ED81C621ED81C6066FC3E
1020 DATA 805A26FB8EE015338D000E
C6C010AEC110AF815A26F71CAF39B0C
1030 DATA 534745D4535055D4E0A6E0
7E80E28EE01D7EADD49602D604DDD9E
1040 DATA 008EE0028D038EE00B6F01
6F03E604E0841D58ED04E606E0029DD
1050 DATA 1D58ED06868 0A7083996 02
D604DD008EE0028D1426F28EE00BA47
1060 DATA 8D0D960BD60D9702D70486
80970A39EC04E384ED84EC06E302B11
1070 DATA ED026A0839170098A6C08D
128D108D0E8D0C1183F18525F04F98D
1080 DATA 1F8B1CAF395F46594659D7
1434028D2B8DAC35828D718D148D940
1090 DATA 128D108D0EA7C01183F185
25F04F1F8B1CAF3934028D378D8C9E0
```

Tandy® Computers: Because there is no better value.™

Tandy® Color Computer 3™

Files
Folder
Disk
Programs in folder 3
Calendar
Filer
Telecom
Ledger
Text
Paint
data 1
data 2
Prog 3
Prog 4
Trash
TANDY

More than fun and games, it's a versatile computer for serious users.

Get real computing power with Radio Shack's most advanced version of the famous Color Computer! The Color Computer 3 is great for small business and home applications such as education, programming, word processing, graphics, entertainment and more.

It's easy to expand with disk drives, printer, telephone modem and more. Plus, the Color Computer 3 comes with 128K RAM (expandable to 512K), giving you greater programming and data-processing power. And for added versatility, the Color Computer 3 is compatible with software and accessories designed for the popular Color Computer 2.

Create incredible razor-sharp graphics with our CM-8 high-resolution monitor (sold separately). You can achieve up to 160 × 192 or 320 × 192 resolution graphics using 16 colors, or 640 × 192 with 4 colors.

The Color Computer 3 offers uncompromising performance at a terrific price. Visit Radio Shack today for a demonstration!

Send me a 1989 RSC-20 computer catalog.

Mail To: Radio Shack
Dept. 89-A-320
300 One Tandy Center
Fort Worth, TX 76102

Name ____________________
Address ____________________
City ____________________
State ____________________
ZIP ____________________
Phone ____________________

Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION

The Complete Rainbow Guide to OS-9

Authors Dale Puckett and Peter Dibble show how to take advantage of OS-9's multitasking and multiuser features. An easy-to-read, step-by-step guide packed with hints, tips, tutorials and free software in the form of program listings.
Book $12.95, Disk Package $19.95 (2 disks, book not included) — a savings of up to 36%!

SAVE 38%! Book and disks only $29.95

The Rainbow Introductory Guide to Statistics

Dr. Michael Plog and Dr. Norman Stenzel give a solid introduction to the realm of statistical processes and thinking for both the beginner and the professional. (80-column printer required.)
Book $2.95, Tape or Disk $2.95 — a savings of 54%!

SAVE 62%! Book and tape or disk only $4.95

Save up to 70%

on our special discount

A Holiday Gift Idea Welcome on Any

The First Rainbow Book of Adventures

Contains 14 winning programs from our first Adventure contest. Includes *Sir Randolph of the Moors, Horror House, One Room, Dr. Avaloe* and more. Plus hints, tips on solving Adventures.
Book $2.00, Tape $2.00 — a 43% savings!

SAVE 50%! Book and tape only $3.50

The Second Rainbow Book of Adventures

Featuring 24 of the most challenging Adventure games ever compiled. Meet the Beatles and battle the Blue Meanies, find a hidden fortune, or win the heart of a mysterious princess. *Ring Quest, Secret Agent Man, Dark Castle, Curse of Karos* and more!
Book $6.95, Tape $6.95 — a 50% savings!

SAVE 57%! Book and tape only $11.95

The Rainbow Book of Simulations

20 award-winning entries from THE RAINBOW's first Simulations contest. You are a Civil War Commander, an air traffic controller, a civil defense coordinator, or a scientist on Mars . . . your wits are on the line. Book $3.50, Tape $3.50 — a savings of 65%!

SAVE 70%! Book and tape only $6

Coming Soon!

The Fourth Rainbow Book of Adventures

packages!

Rainbow Bookshelf!

The Third Rainbow Book of Adventures

The excitement continues with 19 new Adventures. Discover backstage intrigue at the London Theatre, attempt a daring space rescue, or defeat evil in the year 2091 as a genetic android. *Evil Crypt, Spymaster, Time Machine, The Amulet,* and that's only the beginning! Book $6.95, Tape $6.95, Two-Disk Set $7.95 — a savings of up to 47%!

SAVE 45%! Book and tape only $11.95

SAVE 52%! Book and disk only $12.95

The Second Rainbow Book of Simulations

The 16 winners from our second Simulations contest. Fly through dense African jungle, bull your way down Wall Street, lead a bomb squad, or try your hand at Olympic events. Test your skills and talents. Book $4.95, Tape or Disk $4.95 — a 50% savings!

SAVE 55%! Book and tape only $8.95

SAVE 57%! Book and disk only $8.95

Name ____________________

Address ____________________

City ____________________

State ________________ ZIP ________

☐ Payment Enclosed, or ☐ Charge to:

☐ VISA ☐ MasterCard ☐ American Express

Account Number ____________________

Card Expiration Date ____________________

Signature ____________________

☐ **The Rainbow Book of Simulations** (first)	~~$ 9.95~~	$ 3.50	______
☐ Rainbow Simulations Tape(first)	~~$ 9.95~~	$ 3.50	______
☐ First Simulations Package	~~$19.90~~	$ 6.00	______
☐ **The Second Rainbow Book of Simulations**	~~$ 9.95~~	$ 4.95	______
☐ Second Rainbow Simulations Tape	~~$ 9.95~~	$ 4.95	______
☐ Second Rainbow Simulations Disk	~~$10.95~~	$ 4.95	______
☐ Second Simulations Package with Tape	~~$19.90~~	$ 8.95	______
☐ Second Simulations Package with Disk	~~$20.90~~	$ 8.95	______
☐ **The Complete Rainbow Guide to OS-9**	~~$19.95~~	$12.95	______
☐ Rainbow Guide to OS-9 Disk Set (2 disks)	~~$31.00~~	$19.95	______
☐ Rainbow Guide to OS-9 Package	~~$47.95~~	$29.95	______
☐ **The Windows & Applications Disk for** The Complete Rainbow Guide to OS-9 Level II, Vol. I		$19.95	______
☐ **The Rainbow Book of Adventures** (first)	~~$ 7.95~~	$ 2.00	______
☐ Rainbow Adventures Tape (first)	~~$ 7.95~~	$ 2.00	______
☐ First Adventure Package	~~$15.90~~	$ 3.50	______
☐ **The Second Rainbow Book of Adventures**	~~$13.95~~	$ 6.95	______
☐ Second Rainbow Adventures Tape	~~$13.95~~	$ 6.95	______
☐ Second Adventure Package	~~$27.90~~	$11.95	______
☐ **The Third Rainbow Book of Adventures**	~~$11.95~~	$ 6.95	______
☐ Third Adventures Tape	~~$ 9.95~~	$ 6.95	______
☐ Third Adventures Disk Set (2 disks)	~~$14.95~~	$ 7.95	______
☐ Third Adventure Package with Tape	~~$21.90~~	$11.95	______
☐ Third Adventure Package with Disk	~~$26.90~~	$12.95	______
☐ **Introductory Guide to Statistics**	~~$ 6.95~~	$ 2.95	______
☐ Guide to Statistics Tape or Disk (indicate choice)	~~$ 5.95~~	$ 2.95	______
☐ Guide to Statistics Package (indicate choice of tape or disk)	~~$12.90~~	$ 4.95	______
Add $1.50 per book Shipping and Handling in U.S.			______
Outside U.S., add $4 per book			______
Kentucky residents add 5% sales tax			______
(Allow 6 to 8 weeks for delivery)		Total	______

Mail to: Rainbow Bookshelf, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. To order by phone (*credit card orders only*) call (800) 847-0309, 8 a.m. to 5 p.m. EST. For other inquiries call (502) 228-4492.

Please note: The tapes and disks offered by The Rainbow Bookshelf are not stand-alone products. That is, they are intended to be an adjunct and complement to the books. Even if you buy the tape or disk, you will still need the appropriate book for loading and operating instructions. OS-9® is a registered trademark of the Microware Systems Corporation.

```
1100 DATA 35020814460814463 9DC00
C1C024F91E8958445644564456F386E
1110 DATA 00BA1F02D600C403041459
041459588EE165A6A43AAA80A48495C
1120 DATA A7A439DC001E8958445644
564456F300BA1F02E6A4960084039A2
1130 DATA 270548584A26FCD714398D
33B7E00FF7E0118D3C8D29B7E00BACB
1140 DATA F7E00DB7E002F7E0048D2C
8D19B7E006F7E0081A507FFF4086CE1
1150 DATA E01F8BCEE18517FEDF397E
B277BDB26ABDB734304BDB26735D56
1160 DATA 04962C4439C6ACBDB26F39
003F80BF407FC0FF00CF20EF10DFB95
1170 DATA 30FF00F308FB04F70CFF00
FC02FE01FD03FF204D994
```

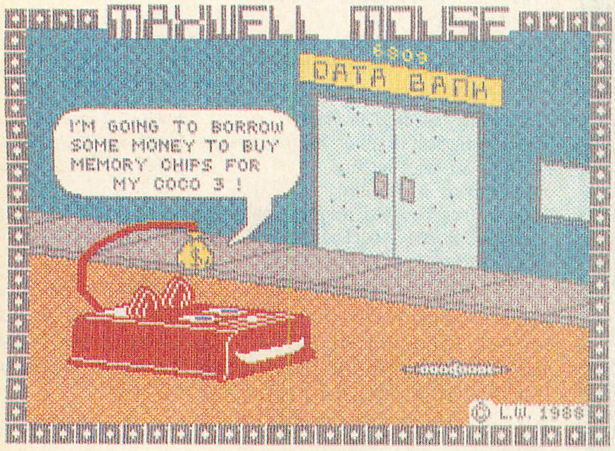
120	110	530	3
250	153	640	107
350	188	END	11

Listing 2: STMPDEMO

```
  5 REM COCO 3 USERS MUST SWITCH
        TO COCO 2 MODE BEFORE KEY-
        ING THIS PROGRAM IN. TYPE
        POKE&HFFDE,0:POKE113,0:
        EXEC&HA027
  8 REM BEFORE KEYING THIS LISTING
        INTO YOUR COCO, THE SUPER-
        STAMPER ALGORITHM MUST BE
        RESIDENT. YOU MAY DO THIS
        BY FIRST RUNNING LISTING
        #1 (SUPRSTMP.BAS), OR BY
        EXECUTING THE ML CLONE
        (STAMP.BIN)
 20 REM FAILURE TO DO THIS WILL
         RESULT IN SYNTAX ERRORS
         AND NONSENSE LISTINGS!
 30 CLEAR 1000, &H7E00
 40 REM *************************
 50 REM *   SUPERSTAMPER DEMO    *
 60 REM *          BY            *
 70 REM *     JEREMY SPILLER     *
80 REM *      COPYRIGHT 1988     *
90 REM **************************
100 CLS:PRINT"IN ORDER TO RUN AN
Y PROGRAM      WHICH USES 'SGET'
OR 'SPUT',     YOU MUST FIRST INS
TALL THE       SUPERSTAMPER ALGOR
ITHM BY EITHERRUNNING SUPRSTMP.B
AS OR BY       EXECUTING STAMP.BI
N."
110 PRINT
120 LINE INPUT"PLEASE PREPARE YO
UR DEVICE AND  INPUT (T)APE OR (
D)ISK TO LOAD  AND EXECUTE STAMP
.BIN, OR       (A)BORT IF YOU HA
VE ALREADY     RUN SUPRSTMP.BAS.
";A$
130 IF A$="T" THEN CLOADM"STAMP.
BIN"ELSE IF A$="D"THEN LOADM"STA
MP.BIN"ELSE GOTO 150
140 EXEC:GOTO 160
150 IF A$="A"THEN GOTO 160 ELSE
GOTO 100
160 PRINT:PRINT STRING$(31,"-"):
INPUT"CAN YOUR TV SUPORT ARTIFIC
IAL   COLORS (Y/N)";A$:IF A$="Y"
 THEN PMODE 4,1:SCREEN 1,1:PMODE
 3,1 ELSE IF A$="N" THEN PMODE 3
,1:SCREEN 1,0 ELSE 160
170 PCLS
180 S$="R6;U3;L6;U3;R6;BD6;BR4"
190 P$="U6;R6;D3;L6;BR6;BD3;BR4"
200 R$="U6;R6;D3;L6;M+6,+3;BR4
210 M$="U6;M+4,+6;M+4,-6;D6;BR4"
220 L$="U6;BD6;R6;BR4"
230 E$="U6;R6;BD3;L6;BD3;R6;BR4"
240 Y$="BR4;U3;M-3,-3;BR7;M-4,+3
;BD3;BR7"
250 DRAW"BM74,12"+S$+";U6;BD6;R6
;U6;BR4;BD6"+P$+E$+R$
260 DRAW S$+"BR4;U6;BL3;R8;BD6;B
R3;U6;R6;D6;BU3;L6;BD3;BR11"+M$+
P$+E$+R$
270 DRAW"BM124,22;L6;U6;R6;D6;BU
3;L6;BD3;BR10"+Y$
280 DRAW"BM99,30;D3;R6;U6;BR3;BD
6"+E$+R$+E$+M$+Y$
290 DRAW"BM99,44"+S$+P$+"U6;BR6;
BD6"+L$+L$+E$+R$
300 SGET(74,13)-(74,5)-(200,5):R
EM GETS THE WORD "SUPERSTAMPER"
```

Mouse Tales

By Logan Ward


MAXWELL MOUSE
6809
DATA BANK
I'M GOING TO BORROW SOME MONEY TO BUY MEMORY CHIPS FOR MY COCO 3 !
$
© L.W. 1988

```
310 SPUT(0,85)-(20,65)-(250,65):
REM STAMPS WORD ELONGATED & SKEW
ED
320 SPUT(0,90)-(20,110)-(250,110
):REM STAMPS WORD UPSIDEDOWN &BA
CKWARD (INVERTED) AND ELONGATED
& SKEWED
330 SGET(97,46)-(97,16)-(166,16)
340 SPUT(50,190)-(50,110)-(220,1
10)
350 GOSUB 670
360 REM DRAWS FIGURE IN BOX
370 PCLS:LINE(88,125)-(168,65),P
SET,B
380 DRAW"C2BM92,123;M+4,-6;M+4,+
6;BM-2,-2;L2"
390 DRAW "BM92,67;D6;R8;U6;L8;BD
3;R8"
400 DRAW"BM164,67;L8;D6;R8"
410 DRAW"BM128,82;D18;M-10,+20;B
R20;M-10,-20"
420 CIRCLE(128,74),8
430 LINE(114,86)-(142,86),PSET
440 CIRCLE(112,86),4,2
450 PAINT (112,86),2,2
460 CIRCLE(144,86),4,3
470 PAINT(144,86),3,3
480 LINE(114,122)-(120,118),PSET
,BF
490 COLOR3
500 LINE(136,122)-(142,118),PSET
,BF
510 SGET(88,126)-(88,65)-(170,65
):REM GETS STICK FIGURE
520 PCLS
530 SPUT(0,62)-(0,0)-(82,0):REM
    NO DISTORTION
540 SPUT(168,62)-(168,0)-(84,0):
REM STAMPS AS MIRROR IMMAGE
550 SPUT(0,65)-(0,65+60)-(82,65+
60):REM INVERTED (UPSIDEDOWN & B
ACKWARDS)
555 SPUT(84,65)-(168,65)-(168,12
6):REM SIDEWAYS (90 DEGREE ROTAT
ION)
560 SPUT(0,191)-(0,129)-(255,129
):REM ELONGATED RIGHT-LEFT
570 SPUT(172,127)-(172,0)-(255,0
):REM ELONGATED UP-DOWN
580 REM THE FOLLOWING DEMONSTRAT
ES SKEWING (TILTING) & ROTATION
590 GOSUB 670:PCLS:SPUT(0,127)-(
0,0)-(255,0):REM ENLARGED ONLY
600 GOSUB 670:PCLS:SPUT(0,127)-(
50,0)-(255,0):REM ENLARGED &  SL
IGHT SKEW
610 GOSUB 670:PCLS:SPUT(0,127)-(
128,0)-(255,0):REM ENLARGED & LA
RGER SKEW
620 GOSUB 670:PCLS:SPUT(200,0)-(
200,127)-(0,127):REM 180 DEGREE
ROTATION (UPSIDEDOWN)
630 GOSUB 670:PCLS:SPUT(128,50)-
(190,110)-(128,160):REM 135 DEGR
EE ROTATION
640 GOSUB 670:PCLS:SPUT(42,95)-(
170,31)-(212,95):REM ELONGATED &
45 DEGREE ROTATION
650 SOUND 150,5:SOUND 100,10
660 GOSUB 670:GOTO 680
670 FOR X=220 TO 255:SOUND X,1:N
EXT:RETURN
680 CLS:PRINT"NOW YOU MAY TRY IN
SERTING YOUR  OWN POINTS A, B AN
D C. YOU DO  NOT NEED PARENTHES
ES.  TYPE THE X AND Y COORDINATE
S SEPARATED BYA COMMA.  REMEMBER
 THAT THE     TOTAL HEIGHT CANNO
T EXCEED 128  PIXELS":PRINT
690 PRINT"EXAMPLE AX,AY ? 0,127"
:PRINT
700 INPUT"AX,AY";AX,AY
710 INPUT"BX,BY";BX,BY
720 INPUT"CX,CY";CX,CY
725 IF A$="N"THEN PMODE 3,1:SCRE
EN 1,0 ELSE IF A$="Y"THEN PMODE
4,1:SCREEN 1,1:PMODE 3,1
730 PCLS:SPUT(AX,AY)-(BX,BY)-(CX
,CY)
740 GOSUB 670:GOTO 680
```

FILE TRANSFER UTILITIES

You asked for it at the Chicago RainbowFest -

FILE TRANSFER UTILITIES NOW HANDLE RSDOS DISKS!

Need to transfer text files to and from PC (MSDOS), RSDOS and FLEX disks into your CoCo (OS-9) system? Have text files on a PC (MSDOS) system at work and want to work on them at home on your CoCo?

With GCS File Transfer Utilities you just place the PC (MSDOS), RSDOS or FLEX disk into your CoCo disk drive - enter a simple command and the file is copied into a CoCo OS-9 file. File transfer back to PC (MSDOS), RSDOS and FLEX disks is just as simple.

PCDIR	directory of PC disk	**RSDIR**	directory of RSDOS disk
PCDUMP	display PC disk sector	**RSDUMP**	display RSDOS disk sector
PCREAD	read PC file	**RSREAD**	read file from RSDOS disk
PCWRITE	write file to PC disk	**RSWRITE**	write file to RSDOS disk
PCRENAME	rename PC file	**FLEXDIR**	directory of FLEX disk
PCDELETE	delete PC file	**FLEXDUMP**	display FLEX disk sector
PCFORMAT	format PC disk	**FLEXREAD**	read FLEX file
		FLEXWRITE	write file to FLEX disk

Extensive Options	Single, double sided disks. 40 or 80 track floppy drives. 8 or 9 sectors. First level sub-directories - PC (MSDOS). FLEX transfers binary files also.
Requires	OS-9 (Level 2 for MultiVue), 2 drives (one can be hard), MultiVue for MultiVue version, SDISK (SDISK3 for MultiVue) - see D.P. Johnson ad for SDISK

GSC File Transfer Utilities for CoCo - MultiVue version $54.95

GSC File Transfer Utilities for CoCo - Standard version $44.95

All diskettes are **CoCo OS-9** format. Orders must be prepaid or COD, VISA/MC accepted, add $1.50 S&H, additional charge for COD.

GRANITE COMPUTER SYSTEMS
Route 2 Box 445 Hillsboro, N.H. 03244
(603) 464-3850

RAINBOW CERTIFICATION SEAL

OS-9 is a trademark of Microware Systems Corporation and Motorola Inc.
MS-DOS is a trademark of Microsoft Corp. FLEX is a trademark of TSC, Inc.

*** *** *** *** COLOR COMPUTER III SOFTWARE *** *** *** ***

CBASIC III EDITOR/COMPILER

The ULTIMATE Color Computer III BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC III is the answer!!!

CBASIC III is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer 3. It will allow you to take full advantage of all the capabilities available in your CoCo-3 including 512K RAM, without having to spend years trying to learn assembly language programming. CBASIC III allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly. CBASIC III supports all the enhanced hardware available in the CoCo-3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts (Keyboard, Timer, Serial & Clock). We even added advanced commands not available in Basic to give you a level of control only avialable to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC III is the friendliest and easiest compiler available for the Color Computer III.

CBASIC III is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocations and so on, because CBASIC III will handle it for you automatically. For Advanced users, CBASIC III will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC III features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/Put, H/Play and H/DRAW, all with 99.9% syntax compatibility. CBASIC III also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with easy to use PRINT, INPUT, INKEY, GETCHAR and PUTCHAR commands.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximatly 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

Requires 128K & Disk $149.00

DATAPACK III PLUS V1.1

SUPER SMART TERMINAL PROGRAM

AUTOPILOT & AUTO-LOG PROCESSORS
X-MODEM DIRECT DISK FILE TRANSFER
VT-100 & VT-52 TERMINAL EMULATION

- No lost data even at 2400 Baud on the COCO-3 Serial I/O port.
- 8 Display Formats, 32/40/64/80 columns at 192 or 225 Res.
- 50K Text Buffer when using the Hi-Res Text Display & Disk.
- ASCII & BINARY disk file transfer support via XMODEM.
- Directly record receive data to a disk file (Data Logging).
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys, position, insert/delete, PF & Alt. keys.
- Programmable Word Length, Parity, Stop Bits and baud rates.
- Complete Full and Half Duplex operation, with no garbled data.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 baud.
- Send Files directly from the Buffer, Macro Keys or Disk.
- Display on Screen or Print the contents of the Buffer.
- Freeze Display & Review information On Line with no data loss.
- Built in Command Menu (Help) Display.
- Built in 2 Drive Ramdisk for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128K & Disk, $59.95

EDT/ASM III

128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground or background colors or even monochrome display modes. It will even support 512K by adding an automatic 2 drive Ultra Fast Ramdisk for lightning fast assembly of program source code larger than memory. There is also a free standing ML Debug Monitor, to help you debug your assembled programs. EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Supports Local and Global string search and/or replace.
- Full Screen line editing with immediate line update.
- Easy to use Single keystroke editing commands.
- Load & Save standard ASCII formatted file formats.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler portion of EDT/ASM III features include:

- Supports the full 6809 instruction set & cross assembles 6800 code.
- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file (include) up to 9 levels deep.
- Supports standard Motorola assembler directives.
- Allows multiple values for FCB & FDB directives (unlike R.S. EDT/ASM)
- Allows assembly from the Editor Buffer, Disk or both.

Requires 128K & Disk $59.95

TEXTPRO IV

"The ADVANCED COCO-3 Word Processing System"

- 9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
- On Screen Display of Bold, Italic, Underline & Double Width print.
- Up to 8 Proportional Character Sets Supported with Justification.
- Up to 80 Programmable Function Keys & Loadable Function key sets.
- Fully Buffered keyboard accepts data even duiring disk access.
- Autoexecute Startup files for easy printer & system configuration.
- 8 Pre-Defined Printer function commands & 10 Programmable ones.
- Supports Library files for unlimited printing & configurations.
- Disk file record access for Mail Merge & Boiler Plate printing.
- Completely Automatic Justification, Centering, Flush left & right.
- Change indents, margins, line length, etc. anytime in the text.
- Create and Edit files larger than memory, up to a full disk.
- Easily imbed any number of printer format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is the most advanced word processing system available for the COCO-3, designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional spacing, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is what your looking for. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time comsuming, and often frustrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128K & Disk $89.95

HI-RES III Screen Commander

The DISPLAY you wanted but didn't get on your CoCo-3

- 54 Different Character Sizes available from 14 to 212 cpl.
- Bold, Italic, Underline, Subscript, Superscript and Plain character styles.
- Double Width, Double Height and Quad width characters.
- Scroll Protect form 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN 3 mode.
- PRINT @ is available in all character sizes & styles.
- Programmable Automatic Key repeat for fast editing.
- Full Control Code Keyboard supported.
- Selectable Character & Background color.
- Uses only 4K of Extended (2nd 64K) or Basic RAM.
- Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example, you can't use PRINT @ or have different character sizes on the same screen, even when mixing text and graphics with the HPRINT command. Hi-RES III can give you the kind of display you always dreamed about having on your CoCo-3, with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. With the full control code keyboard, you can control many of HI-RES III extended functions with just a couple of simple keystrokes.

Requires 128K Tape or Disk $34.95

512K RAMDISK & MEMORY TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in you CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk $19.95

"The SOURCE III"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE III will allow you to easily Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler compatible Source code.

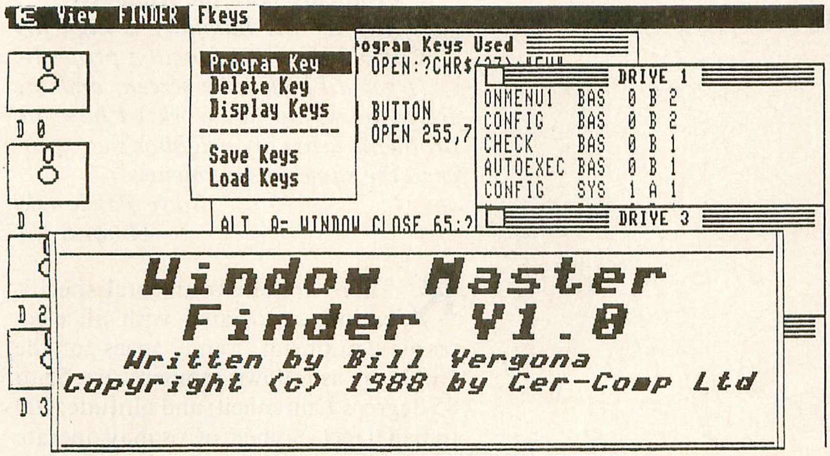
- Automatic label generation and allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk, unlike other disassemblers.
- Automatically locates Begin, End and Execution address.
- Output Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler source files directly to disk or printer.
- Built in Hex/Ascii dump/display to locate FCB, FCC & FDB areas.
- 8 Selectable Display formats 32/40/64/80 columns in 192 or 225 Res.
- Selectable Foreground & Background colors & Printer Baud rates.
- Built in Disk Directory an Kill file commands.
- Menu display with single key commands for smooth, Easy operation.
- Written in Ultra Fast Machine Language.

Requires 128K & Disk $49.95

To order products by mail, send check or money order for the amount of purchase, plus $3.00 for shipping & handling to the address below.
To Order by VISA, MASTERCARD or COD call us at (702) 452-0632
(Monday thru Saturday, 8am to 5pm PST)

CER-COMP LTD.
5566 Ricochet Avenue
Las Vegas, Nevada 89110
(702) 452-0632

"Window Master"



```
ONMENU1  BAS  0 B 2
CONFIG   BAS  0 B 2
CHECK    BAS  0 B 1
AUTOEXEC BAS  0 B 1
CONFIG   SYS  1 A 1
```

Window Master
Finder V1.0
Written by Bill Vergona
Copyright (c) 1988 by Cer-Comp Ltd

Screen Display Fonts

Window Master supports up to 54 different character sizes on the screen with 5 different character styles. You can have Bold, Italic, Underlined, Super-Script, Sub-script or Plain character styles or any combination of them in any character size. You can also change the text color and background at any time to get really colorful displays.

Fully Basic Compatible

Window Master is fully compatible with Enhanced Color Disk basic with over 50 Commands & functions added to fully support the Point & Click Window System. Window Master does not take any memory away from Basic, so you still have all the Basic Program memory available.

Hi-Resolution Displays

Window Master uses the full potential of the Color Computer 3 display by using the 225 vertical resolution display modes instead of the 192 or 200 resolution modes like most other programs. It uses either the 320/16 color mode or the 640/4 color display to give you the best display resolution possible, and can be switched to either mode at any time.

Mixed Text & Graphics

Window Master fully supports both Text & Graphics displays and even has a Graphics Pen that can be used with HLINE, HCIRCLE, HSET and more. You can change the Pen width & depth and turn it on or off with simple commands. We also added Enhanced Graphics Attributes that allow graphics statements to use And, Or, Xor and Copy modes to display graphic information. With the Graphics enhancements added by Window Master, you could write a "COCOMAX" type program in Basic! In fact we provide a small graphics demo program written in Basic.

Event Processing

Window Master adds a powerful new programming feature to Basic that enables you to do "Real Time" Programming in Basic. It's called Event Trapping, and it allows a program to detect and respond to certain "events" as they occur. You can trap Dialog activity, Time passage, Menu Selections, Keyboard activity and Mouse Activity with simple On Gosub statements, and when the specified event occurs, program control is automatically routed to the event handling routine, just like a Basic Gosub. After servicing the event, the sub-routine executes a Return statement and the program resumes execution at the statement where the event occured.

Enhanced Editing Features

Window Master adds an enhanced editor to Basic that allows you to see what you edit. It allows you to insert & delete by character or word, move left or right a word or character at a time, move to begin or end of line, toggle automatic insert on/off or just type over to replace characters. The editor can also recall the last line entered or edited with a single key stroke. You can even change the line number in line to copy it to a new location in the program.

Window Master Features

Multiple Windows

Window Master supports multiple window displays with up to a maximum of 31 windows on the screen. Overlapping windows are supported, and any window can be made active or brought to the top of the screen. Windows can be picked up and moved anywhere on the screen with the mouse. There are 6 different Window styles to choose from and the window text, border and background color is selectable.

Pull Down Menus

Menus are completely programmable with up to 16 menus available. They can be added or deleted at any time in a program. Menu items can be enabled, disabled, checked or cleared easily under program control. Menu selection is automatically handled by Window Master & all you have to do is read a function variable to find out which menu was selected.

Buttons, Icons & Edit Fields

Each Window can have up to 128 buttons, Icons or Edit fields active, if you can fit that many. Buttons, Icons and Edit field selection is handled automatically by Window Master when the mouse is clicked on one. All you have to do is read a Dialog function to find out which Button, Icon, or Edit field was selected, its very simple.

Mouse & Keyboard Functions

Window Master automatically handles the Mouse pointer movement, display and button clicks. It will tell you the current screen coordinate, the local window coordinate, window number the mouse is in, the number of times the button was pressed, which window number it was clicked in and more. The Keyboard is completely buffered, and supports up to 80 programmable Function keys that can contain any kind of information or command sequences you can imagine. You can load and save function key sets at any time. So, you can have special sets of function keys for different tasks. The "Ctrl" key is supported so that you have a full control code keyboard available.

Window Master Applications

Window Master pushs the Color Computer 3 far beyond its normal capabilities, into the world of a "User Friendly" operating enviornment. We are already planning several new programs for use with Window Master. So you don't have to worry about having to write all your own programs. And don't forget that many existing Basic and M.L. programs will run under Window Master with little or no changes. The Possibilities for Application programs are endless: Spread Sheets, Word Processing, Communications, Education, Games, Graphic Design, Desk Top Publishing and on and on.

Hardware Requirements

Window Master requires 512K of memory, at least 1 Disk Drive, a Hi-Res Joystick Interface and a Mouse or Joystick.

Technical Assistance

If you run into difficulty trying to use some of Window Master's features, we will be happy to assist you in any way possible. You can write to us at the address below or call us between 10am and 2pm Pacific Standard Time for a more timely response. Sorry, no collect calls will be accepted.

Ordering Information

To order WINDOW MASTER by mail, send check or money order for $69.95, plus $3.00 for shipping & handling to the address below. To order by VISA, MASTERCARD or COD call us at (702)-452-0632
(Monday thru Saturday, 8am to 5pm PST)

CER-COMP Ltd.
5566 Ricochet Avenue
Las Vegas, Nevada 89110
(702)-452-0632

DOCTOR Q&A ASCII

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Some Terms Defined

I've had my CoCo 2 for about a year now. Before that I knew very little about writing programs. Could you print a column on what `PEEK`, `POKE`, *text, screen dump,* `HDRAW`, `HPRINT`, `DATA` *and* `SOUND` *mean. I need this information so I can become a better CoCo 2 user.*

Chris Provence
Saranac, NY

℞ I can define those terms for you: `PEEK` is used to determine the value stored at an address in memory; e.g. `PRINT PEEK(1463)` will print the value stored at address 1463 in memory. The opposite of `PEEK` is `POKE`.

`POKE` is used to change the value stored at an address in memory; e.g. `POKE 1463,2` changes the value stored at Address 1463 to two.

Text files are files comprised of ASCII values. ASCII is an industry-standard code for representing text (components of alphabetic and numeric strings) using one-byte values (eight bits stored at a single address). 'A' = 65, 'B' = 66, . . . '0' = 48, '1' = 49, etc.

A screen dump is a printer's representation of what can be viewed on a computer's screen.

`HDRAW`, similar to the `DRAW` command on the CoCo 1, draws lines and boxes and works only with the newer Hi-Res modes on the CoCo 3.

`HPRINT` allows you to put text on a CoCo 3's Hi-Res screen.

`DATA` statements are used in conjunction with `READ` statements; e.g.:

```
10 READ X
20 DATA 23, 46, 55
```

The `READ` statement in Line 10 will pick up the value `23` for `X`. If another `READ` statement is encountered, it will use the value 46, etc.

The `SOUND` command is used to send audio effects to your TV speaker. `SOUND 3,30` sends a low-pitched sound for 30 six-hundredths seconds.

Richard Esposito is the principal engineer for BDM Corporation. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

A Good Deal

I have recently come across a super deal on IBM disk drives. They are the double-sided drives found on the discontinued IBM PCjr. Will these drives fit and work in the FD500 case? Also, can I use both sides of the drive from Disk BASIC, *or just from OS-9? If I can't use both sides, will I be able to use one side of the drive?*

Kent Signorini
Grimshaw, Alberta

℞ The IBM disk drive should fit the FD500 case and use your power supply, but you may need to modify your cable. SpectroSystem's ADOS or Burke & Burke's *Hyper-IO* can provide the double-sided capability.

CoCo 2 and 3 — Programs Don't Mix

I own a CoCo 2, Version 1, Release 1, with disk drive. Is there any way to get CoCo 3 programs to run on my machine?

Duane Shwartz
Merrill WI

℞ Unfortunately, *no*. CoCo 3-specific programs take advantage of its additional memory and unique hardware.

Problems With the Humidity

Whenever the humidity is high my CoCo 2 does not function properly. (I get a blank gray screen, and the ROM packs do not work.) I have no problems using my neighbor's computer in the same environment.

Steve Pawlowski
Elmont, NY

℞ There are environmental specifications associated with all electronic equipment. Tandy specs for the CoCo are as follows: temperature, 55 to 85 degrees Fahrenheit; and altitude, 100 to 6,000 feet. Some CoCos may operate outside these specs due to relative age, small differences in parts, manufacturing, etc. As long as your machine operates within the published specs, there is nothing wrong with it. As mentioned before, for many years air-conditioned environments were required to operate computers at all.

IBM Software on a CoCo

In past articles, readers have asked if IBM software could run on the CoCo. I have heard that it was possible to run Apple software on the Tandy 1000. If this is so, why couldn't something be made to run IBM software on the CoCo?

Jared Hawley
Honolulu, HA

℞ Granted, with Tandy's Trackstar 128 board installed in a Tandy 1000, you can run Apple II software; but it costs $399 — twice the price of a CoCo 3! IBM PC coprocessors for the Atari ST and Apple Macintosh run around $1,000 each. Who would buy such a card for a CoCo when a separate Tandy 1000 could be purchased for the same price — or less?

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

Replace CoCo 3's built-in HPRINT font

The Font Master

By Eric Wolf

Stored in the new CoCo 3 is a high resolution font, a specially designed `HPRINT` character set. The area of memory in which the font is stored is called upon whenever the command `HPRINT` is performed. Each letter of the message is referenced in the font table of the high resolution graphics screen.

The font table is stored in RAM, which means you can read and write to it. (Its memory location is $F09D through $F49C, for characters 32-127.) *Font Master* allows you to easily change these characters, giving your Hi-Res screens that personal touch.

Font Master uses the 16-color, 320-by-192 graphics screen of the CoCo 3. It offers onscreen menu selection, complete error trapping, choice of tape or disk, editing commands, and easy integration with BASIC and machine language.

Upon saving, loading and running the program, the main screen appears, consisting of a command set (upper-right), editing window (upper-left) and the current character set (bottom). Let's look at these one at a time.

The Edit window shows an enlarged version of the character you are working on and how it presently looks. The current character set is what the entire character set in memory looks like. The highlighted letter is the letter you are currently editing. The command set is a brief listing of all the commands recognized by the *Font Master*, and includes the following:

arrows	control the cursor within the editing window
space bar	sets (turns on) a dot in the editing window
CLEAR	resets (turns off) a dot in the editing window
C	clears entire editing window
X	saves current character and allows you to select a new character to edit
L	loads a character set from tape or disk
S	saves a character set to tape or disk
I	inverts the grid (changes white to black and black to white)

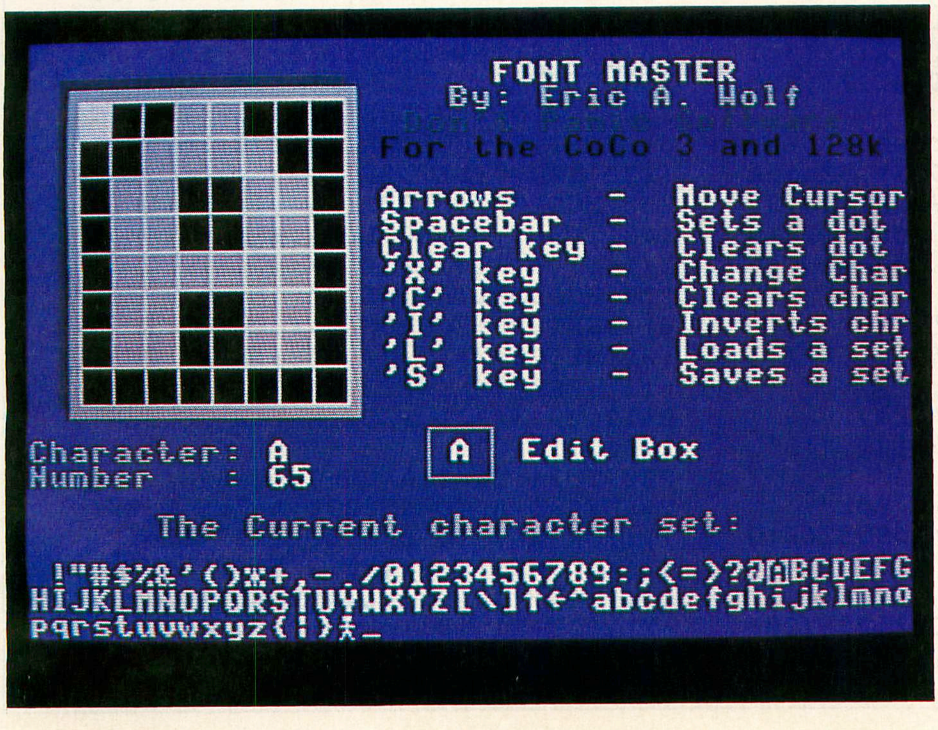
I have included two pre-designed font files (cursive and bold) for you to use and modify for your own purposes. They are included on this month's RAINBOW ON TAPE and DISK.

After you have saved your character set (using *Font Master*), you can integrate it into your own BASIC programs. First, load the program that uses the `HPRINT` command. Then load your character set — type `(C)LOADM` and press ENTER. Then, just run your program and the new character set will be in use.

Be careful about pressing the reset button. Doing so restores the original `HPRINT` font set. After pressing reset, you must reload the character set if you want to use it again.

(Questions or comments about this program may be directed to the author at 1630 N. Johnson St., South Bend, IN 46628. Please enclose an SASE when writing for a reply.) ☐

Eric Wolf is a free-lance programmer and attends LaSalle High School. He is currently writing a line of computer software that deals with games and utilities, and ML applications for the CoCo.



```
           FONT MASTER
         By: Eric A. Wolf
        For the CoCo 3 and 128k

        Arrows      -  Move Cursor
        Spacebar    -  Sets a dot
        Clear key   -  Clears dot
        'X' key     -  Change Char
        'C' key     -  Clears char
        'I' key     -  Inverts chr
        'L' key     -  Loads a set
        'S' key     -  Saves a set

Character: A         A  Edit Box
Number   : 65

    The Current character set:

 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFG
HIJKLMNOPQRSTUVWXYZ[\]↑←^abcdefghijklmno
pqrstuvwxyz{|}~_
```

130	191	425	23
180	31	495	6
260	243	555	200
305	63	640	16
375	84	END	194

The listing: FONTMSTR

```
15 REM RAINBOW MAGAZINE PRESENTS
20 REM
25 REM *************************
30 REM *  The Font Master !!!  *
35 REM *    By: Eric A. Wolf    *
40 REM * Don't Panic Software  *
45 REM * For a CoCo 3 and 128k *
50 REM *************************
55 REM
65 ONBRK GOTO 710
70 ONERR GOTO 530
75 PALETTE RGB
80 POKE65497,0
85 RESTORE:FORY=0TO15:READ A:PAL
ETTE Y,A:NEXTY
90 DATA 8,56,0,3,3,63,3,0,63,9,0
,0,0,0,0,63
95 ATTR 7,0
100 WIDTH 40
105 HBUFF 1,5000
110 HBUFF 2,128
115 CH=65
120 HSCREEN2:HCLS
125 HCOLOR15:HPRINT(21,1),"FONT
MASTER":HCOLOR1:HPRINT(19,2),"By
: Eric A. Wolf":HCOLOR6:HPRINT(1
7,3),"Don't Panic Software":HCOL
OR2:HPRINT(16,4),"For the CoCo 3
 and 128k"
130 HCOLOR1:HPRINT(6,19),"The Cu
rrent character set:":HPRINT(0,1
6),"Character:":HPRINT(0,17),"Nu
mber    :":HCOLOR15
135  HPRINT(16,6),"Arrows    -
Move Cursor":HPRINT(16,7),"Space
bar  -  Sets a dot":HPRINT(16,8)
,"Clear key -  Clears dot":HPRIN
T(16,9),"'X' key    -  Change Cha
r"
140 HPRINT(16,10),"'C' key    -
Clears char":HPRINT(16,11),"'I'
key   -  Inverts chr"
145 HPRINT(16,12),"'L' key    -
Loads a set":HPRINT(16,13),"'S'
key    -  Saves a set"
150 HPRINT(22,16),"Edit Box"
155 GOSUB250:GOSUB305:GOSUB260:G
OSUB280
160 C1=0:C2=0
165 HGET(20+C1*12,20+C2*12)-(20+
C1*12+11,20+C2*12+11),1:HCOLOR15
:HLINE(20+C1*12,20+C2*12)-(20+C1
*12+11,20+C2*12+11),PSET,BF
170 A$=INKEY$:IFA$=""THEN170 ELS
E HPUT(20+C1*12,20+C2*12)-(20+C1
*12+11,20+C2*12+11),1,PSET
175 IF A$=CHR$(8) THEN C1=C1-1:I
F C1<0 THEN C1=0:SOUND100,1
180 IF A$=CHR$(9) THEN C1=C1+1:I
F C1>7 THEN C1=7:SOUND100,1
185 IFA$=CHR$(10) THEN C2=C2+1:I
F C2>7 THEN C2=7:SOUND100,1
190 IFA$=CHR$(94) THEN C2=C2-1:I
F C2<0 THEN C2=0:SOUND100,1
195 IFA$=CHR$(32) THEN HCOLOR1:H
PAINT(24+C1*12,24+C2*12),1,15:HS
ET(151+C1,128+C2,15):PLAY"V31T25
5L255;CC"
200 IFA$=CHR$(12) THEN HCOLOR2:H
PAINT(24+C1*12,24+C2*12),2,15:HS
ET(151+C1,128+C2,0):PLAY"V31T255
L255;CC"
205 IFA$=CHR$(67) THEN SOUND100,
1:GOSUB265
210 IFA$=CHR$(73) THEN GOSUB320
215 IFA$=CHR$(88) THEN GOSUB385:
GOSUB340:GOSUB250:GOSUB305:GOSUB
265:GOSUB280
220 IFA$=CHR$(76) THEN GOSUB385:
Z$=A$:GOTO405
225 IFA$=CHR$(83) THEN GOSUB385:
Z$=A$:GOTO405
230 GOTO 165
235 '
240 ' PROGRAM SUBROUTINES
245 '
250 HCOLOR0:HLINE(0,168)-(319,19
2),PSET,BF:HCOLOR15:T=21:FORY=32
 TO 128 STEP 40:A$="":FOR X=Y TO
 Y+39:A$=A$+CHR$(X):NEXTX:HPRINT
(0,T),A$:T=T+1:NEXTY
255 RETURN
260 HCOLOR3:HLINE(12,12)-(116,11
6),PSET,BF:HCOLOR1:HLINE(16,16)-
(120,120),PSET,BF
265 HCOLOR0:HLINE(144,124)-(166,
140),PSET,BF:HCOLOR1:HLINE(144,1
24)-(166,140),PSET,B:
270 HCOLOR2:HLINE(20,20)-(116,11
6),PSET,BF:HCOLOR15:FOR X=0 TO 8
:HLINE(20+X*12,20)-(20+X*12,20+8
*12),PSET:HLINE(20,20+X*12)-(20+
8*12,20+X*12),PSET:NEXTX:RETURN
275 GOTO 275
280 T=24:T1=0:A=CH-32:A=A*8:FOR
Y=&HF09D+A TO &HF09D+A+7:P=PEEK(
Y):FOR X=7 TO 0 STEP-1:IF P>=INT
(2^X) THEN P=P-INT(2^X):HPAINT(2
4+((7-X)*12),T),1,15:HSET(151+(7
-X),128+T1,15)
285 NEXTX:T=T+12:T1=T1+1:NEXTY:H
```

The Professional Color Computer

Enhancements for Productivity from HJL Products

HJL
PRODUCTS
Div. of Touchstone Technology Inc.
GoldStar
12" MONOCHROME
NUMBERJACK
The HJL Numeric Keypad
SoftSwitch
TOUCHSTONE
SPACE BAR

For peak performance with any computer, you have to get information into and out of the system as easily as possible.

This is the purpose of the HJL family of professional enhancements for ALL MODELS of the Color Computer, including CoCo 3.

The Self-contained ProCase-57 Keyboard - $79.95 **NEW**

It's the popular HJL keyboard perfectly fitted into its own sleek, low-profile case. Put your CoCo on a shelf or hang it on the side of your desk. ProCase-57 comes with 5-foot cable; installs in just a few minutes with no soldering.

The HJL-57 Keyboard Kit - $59.95/69.95

Overwhelming favorite of serious CoCo users worldwide, the HJL-57 keyboard provides the smooth consistent feel and *reliability you* need for maximum speed with minimum input errors. Installs in your color computer without soldering. Just $59.95 for Original or F-version. Kits for CoCo 2 and CoCo 3 are $69.95.

The NumberJack Keypad - $59.95

A self-contained numeric keypad for serious number-crunching. Besides the numbers, it has all the cursors, symbols and math keys, including autoshifted ADD and MULTIPLY. Includes cable and connectors for solderless installation.

The Monitor Adapter - $25.95

This universal driver works with all monochrome monitors. Easily installed without clips, jumpers or soldering (except some CoCo 2s with soldered-in video chips). Here's crisp, flicker-free monitor output with all the reliability you've come to expect from HJL Products.

The Monitor - $99.95

Our high-resolution amber monitor gives you the display preferred by most computer pros. Once you've used it, you'll never go back to the TV set. 12-inch CRT has etched non-glare face-plate. (Requires adapter sold above)

Quick Basic Plus - $19.95

High-performance programming aid works with any CoCo that has 4 function keys. 26 one-touch BASIC statements, 10 user-defined macros at a time (save as many sets of macros as you like), auto line-numbering, instant screen dump to printer, and global search, make this software ideal for any BASIC programmer. Specify disk or cassette.

The SoftSwitch - $89.95

Connect any two parallel printers to one computer; select printers manually or insert a simple printer code in the text to be printed for fully-automatic, all solid-state switching. Complete with three cables and operating instructions.

The HJL Warranty

Every HJL product comes with a full, one-year warranty and the exclusive HJL 15-day unconditional guarantee (except software).

Pick a Pair and Save 15%

Take 15% off the price of any two or more products shown here. Just mention this ad when you order.

Call Now, Toll Free

1-800-828-6968

In New York 1-800-462-4891

International calls: 716-235-8358

HJL
PRODUCTS
Div. of Touchstone Technology Inc.
955 Buffalo Road • P.O. Box 24954
Rochester, New York 14624

Ordering Information: Specify model (Original, F-version, or CoCo 2 Model Number). Payment by C.O.D., check, MasterCard, or Visa. Credit card customers include complete card number and expiration date. Add $2.00 for shipping, 3.50 to Canada; except monitors (call for shipping charges before ordering monitors). New York state residents add 7% sales tax. **Dealer Inquiries Invited**

```
COLOR0:HLINE(88,16*8)-(112,18*8)
,PSET,BF:HCOLOR15:HPRINT(10,17),
CH:HPRINT(11,16),CHR$(CH)
290 RETURN
295 NEXTX,Y
300 RETURN
305 W2=INT((CH-32)/40):W1=(CH-32
)-W2*40
310 HGET(W1*8,168+W2*8)-(W1*8+7,
168+W2*8+7),2:HPUT(W1*8,168+W2*8
)-(W1*8+7,168+W2*8+7),2,NOT:RETU
RN
315 HPUT(W1*8,168+W2*8)-(W1*8+7,
168+W2*8+7),2,PSET:RETURN
320 SOUND200,1:FORY=0TO7:FORX=0
TO 7
325 IF HPOINT(24+(X*12),24+(Y*12
))=1 THEN HPAINT(24+(X*12),24+(Y
*12)),2,15:HSET(151+X,128+Y,0) E
LSE HPAINT(24+(X*12),24+(Y*12)),
1,15:HSET(151+X,128+Y,15)
330 NEXTX,Y:RETURN
335 GOTO335
340 HCOLOR0:HPRINT(6,19),"The Cu
rrent character set:":HCOLOR1:HP
RINT(8,19),"Select new character
":SOUND100,1:GOSUB315
345 GOSUB305
350 A$=INKEY$:IFA$=""THEN350 ELS
E GOSUB315
355 IF A$=CHR$(94) THEN CH=CH-40
:IF CH<32 THEN CH=CH+40
360 IF A$=CHR$(10) THEN CH=CH+40
:IF CH>127 THEN CH=CH-40
365 IF A$=CHR$(8) THEN CH=CH-1:I
F CH<32 THEN CH=32
370 IF A$=CHR$(9) THEN CH=CH+1:I
F CH>128 THEN CH=127
375 IF A$<>CHR$(13) THEN 345 ELS
E SOUND100,1:HCOLOR0:HPRINT(8,19
),"Select new character":HCOLOR1
:HPRINT(6,19),"The Current chara
cter set:"
380 RETURN
385 SOUND200,1:A=CH-32:A=A*8:FOR
Y=0TO7:P=0:FORX=0 TO 7
390 IF HPOINT(24+(X*12),24+(Y*12
))=1 THEN P=P+(2^(7-X))
395 NEXTX:POKE &HF09D+A+Y,P:NEXT
Y
400 RETURN
405 IF Z$="L" THEN 410 ELSE IF Z
$="S" THEN 580 ELSE RUN
410 HSCREEN0:ATTR 7,0:CLS:LOCATE
9,1:ATTR 7,0,U:PRINT"Load a char
acter set:";:ATTR 7,0:LOCATE 1,7
:PRINT"Use arrows to select & Pr
ess <ENTER>."
415 CR=1
420 ATTR 7,0:LOCATE 14,3:PRINT"F
rom disk":LOCATE 14,4:PRINT"From
 tape":LOCATE14,5:PRINT"Exit bac
k"
425 IF CR=1 THEN LOCATE 14,3:ATT
R 1,5:PRINT"From disk"; ELSE IFC
R=2 THEN LOCATE 14,4:ATTR 1,5:PR
INT"From tape"; ELSE LOCATE 14,5
:ATTR 1,5:PRINT"Exit back";
430 A$=INKEY$:IFA$=""THEN430
435 IFA$=CHR$(13) THEN 450 ELSE
IF A$="^" THEN CR=CR-1:IF CR<1 T
HEN CR=3
440 IF A$=CHR$(10) THEN CR=CR+1:
IF CR>3 THEN CR=1
445 GOTO 420
450 ATTR 7,0:IF CR=3 THEN GOTO12
0
455 ON CR GOTO 460,475
460 POKE65496,0:CLS:PRINT"INSERT
 "+CHR$(34)+"CHARACTER SET"+CHR$
(34)+" DISK IN DRIVE":PRINT"#0 A
ND PRESS ANY KEY FOR A DIRECTORY
."
465 A$=INKEY$:IFA$=""THEN465 ELS
E DIR0
470 GOTO 480
475 CLS:POKE65496,0:PRINT"Prepar
e the cassette recorder":PRINT"f
or loading a character set....."
:PRINT
480 PRINT:LINEINPUT"Enter Filena
me: ";A$
485 IF LEN(A$)=0 THEN 495 ELSE I
F LEN(A$)>8 AND CR=2 THEN 490 EL
SE IF LEN(A$)>14 AND CR=1 THEN 4
90 ELSE IF LEN(A$)>8 AND INSTR(A
$,"/")=0 THEN 490 ELSE 500
490 PRINT"Filename too long !":G
OTO480
495 PRINT"Please enter a filenam
e !!":GOTO480
500 IF INSTR(A$,"/")=0 AND LEN(A
$)=<8 AND CR=1 THEN A$=A$+"/BIN:
0"
505 ON CR GOTO 510,520
510 LOADM A$
515 GOTO 525
520 CLOADM A$
525 PRINT:PRINT"Loaded ....":FOR
X=1TO1000:NEXTX:POKE65497,0:GOTO
120
530 CLS:B$="Unkwown Error... #"+
STR$(ERNO)+" In "+STR$(ERLIN)
535 IF ERNO=20 THENB$="I/O ERROR
" ELSEIF ERNO=19 THEN B$="Device
 number error" ELSE IF(ERNO=31 O
R ERNO=26)THEN B$="Can't find co
rrect character file" ELSEIF ERN
O=23 THEN B$="Input past end of
file ..."\
540 IF ERNO=1 THEN B$="Syntax Er
ror in line "+STR$(ERLIN)
```

```
545 FORY=1TO2:LOCATE(20-LEN(B$)/
2),6:PRINTB$:NEXTY
550 LOCATE 4,13:PRINT"Do you wis
h to try again (Y/N)"
555 A$=INKEY$:IFA$="Y" THEN GOTO
 405 ELSE IFA$="N" THEN 120 ELSE
 555
560 IF Z$="L" THEN 455 ELSE 115
565 ATTR7,1:CLS:LOCATE 5,11:PRIN
T"File not on device specified":
GOTO550
570 CLS:LOCATE10,11:PRINT"Input
past end of file":GOTO550
575 CLS:PRINT"ATTENTION USER !!!
"::PRINT"ERROR #";ERNO;"IN LINE
";:PRINT ERLIN:PRINT:END
580 HSCREEN0:ATTR 7,0:CLS:LOCATE
 9,1:ATTR 7,0,U:PRINT"Save a char
acter set:";:ATTR 7,0:LOCATE 1,7
:PRINT"Use arrows to select & Pr
ess <ENTER>."
585 CR=1
590 ATTR 7,0:LOCATE 14,3:PRINT"T
o disk":LOCATE14,4:PRINT"To tape
":LOCATE14,5:PRINT"Exit back"
595 IF CR=1 THEN LOCATE 14,3:ATT
R 1,5:PRINT"To disk"; ELSE IFCR=
2 THEN LOCATE 14,4:ATTR 1,5:PRIN
T"To tape"; ELSE LOCATE 14,5:ATT
R 1,5:PRINT"Exit back";
600 A$=INKEY$:IFA$=""THEN600
605 IFA$=CHR$(13) THEN 620 ELSE
IF A$="^" THEN CR=CR-1:IF CR<1 T
HEN CR=3
610 IF A$=CHR$(10) THEN CR=CR+1:
IF CR>3 THEN CR=1
615 GOTO 590
620 ATTR 7,0:IF CR=3 THEN GOTO12
0
625 ON CR GOTO 630,640
630 POKE65496,0:CLS:PRINT"Insert
 disk to save character set upon
  into drive #0"
635 GOTO 645
640 POKE65496,0:CLS:PRINT"Prepar
e cassette to save character set
."
645 PRINT:LINEINPUT"Enter Filena
me: ";A$
650 IF LEN(A$)=0 THEN 660 ELSE I
F LEN(A$)>8 AND CR=2 THEN 655 EL
SE IF LEN(A$)>14 AND CR=1 THEN 6
55 ELSE IF LEN(A$)>8 AND INSTR(A
$,"/")=0 THEN 655 ELSE 665
655 PRINT"Filename too long !":G
OTO645
660 PRINT"Please enter a filenam
e !!":GOTO645
665 IF LEN(A$)=<8 AND INSTR(A$,"
/")=0 AND CR=1 THEN A$=A$+"/BIN:
0"
670 PRINT:PRINT"Press any key to
 save..."
675 B$=INKEY$:IFB$=""THEN675
680 ON CR GOTO 685,695
685 VERIFYON:SAVEM A$,&HF09D,&HF
49C,&HF09D
690 GOTO 700
695 CSAVEM A$,&HF09D,&HF49C,&HF0
9D
700 PRINT:PRINT"Saved ...":FORX=
1TO1000:NEXTX:POKE65497,0:GOTO12
0

705 REM ** END OF PROGRAM **
710 HSCREEN 0:STOP
```

PREMIUM COCO3 512K UPGRADE

- Made in USA by J&R Electronics
- Memory chips socketed, user replaceable
- Rugged, long life construction
- Top mounted Memory for cooling
- Heavy duty POWER and GROUND planes to minimize memory errors due to noise
- High performance design, permits use of less expensive 150ns memory chips
- We supply Prime memory chips, not inferior pulls or fallouts*
- Includes RAMDISK, Spooler and Memory Test software on disk with 28 page User's Manual (We set the standard for 512K support software. We believe our software is uniquely powerful, as opposed to those 'Me, too' companies that charge extra for software with much less power!)

SPECIAL PRICES

#1010-29.95 JramR bare board plus connectors and software

#1014-39.95 JramR assembled & tested 0K (No memory chips) and software

*CALL (for latest price of #1014 with memory chips and other products)

To place an order, write to: J&R Electronics, P.O. Box 2572, Columbia, MD 21045, OR call (301) 987-9067-Jesse or (301) 788-0861-Ray

CocoTech NEW

MACPLAY

RAINBOW CERTIFICATION SEAL

With **MACPLAY** and a CoCo 3 you can play MAC sound files (Included on the second diskette) with pure 6 BIT sound quality that the CoCo can produce! Or download other MAC sound files from a computer information service or MAC bulletin board systems to hear even more. Sound files can last for a few seconds or up to 1/2 minute. MAC sound files included on the second diskette contain excerpts from the 3 Stooges to the Road Runnner and more!!

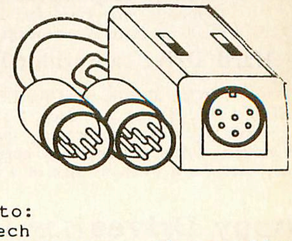
MACPLAY is only..........$ 19.95

ULTIMAX

You can use **UltiMax** as a normal HI-REZ joystick interface or switch it to be used with a popular Max III graphics program. The other feature of **UltiMax** is the option to have a large or small stick area so you can be more accurate with your drawings!

The **UltiMax** interface is only **$29.95**

Or trade in your original HiRes interface (sent postage prepaid) and get **UltiMax** for only............$14.95



Send to:
CocoTech
208 Cathy Ann Drive
Reading, PA 19606
(215)-779-7768

PA residents add 6% sales tax

Please allow 1 to 3 weeks for delivery

Shipping and handling:
USA and Canada add $2.50
Other countries add $5.00

Sorry no credit cards **YET!**

** We now handle C.O.D.'s **

Frank Hogg Laboratory

12 Years of Servic t, and Friendly Help!

DISCOU ICE LIST

NEW LOWER PRICES!!

CoCo Burke & Burke Hard Drive Kits

FLASH!** More Burke and Burke systems have been bought in the last six months than other systems have sold in the last **3 years!!!!

Our first system features the Burke & Burke XT or XT RTC interface. This interface uses popular and inexpensive IBM PC type controllers. For this reason it is the least expensive hard disk system available today. Not as fast as the Isted system but faster than any other system available. It also supports RLL drives. **Note:** Disk Extended Color Basic support and other software options are listed on our price list. **Disadvantage**; requires a multi-pak.

KIT INCLUDES: Burke & Burke (B&B) XT PC interface. Hard drive with controller, 3 foot ST506 cable set. Hard Drive Case with 60 watt power supply and **fan**. Includes OS9 LI and LII software. 1 megabyte transfer in 45 seconds! Type ahead under OS9. Complete instructions. Easy one evening assembly.

NEW LOWER PRICES!!

1 YEAR WARRANTY ON ALL SYSTEMS!

20 Meg Kit Complete 60MS	*498.00
30 Meg Kit Complete 60MS RLL	*548.00
40 Meg Kit Complete 60MS	*618.00
Assemble and test any of the above add	50.00
OPTIONS:	
B&B Real Time Clock (add to above)	30.00
B&B XT ROM Auto Boot from hard disk	19.95
B&B Hyper I/O run DECB on hard drive	29.95
B&B Hyper III Ramdisk/spooler for above	19.95
FBU Fast Hard disk Back Up	75.00

Hard Drive Bits and Pieces

NEW LOWER PRICES!!

B&B XT PC style interface	69.95
B&B XT RTC interface w/clock/calendar (Call for Hard Drive and Kit prices)	99.95
FHL HCA/WD High Speed Interface	*99.95
WD 1002-05 High Speed for FHL Interface (Supports both Hard and Floppy drives) (Call for Hard Drive prices)	*196.00
Hard Drive case with 60W P/S and Fan	*98.00

(Can also be used for floppy drives)
SPECIFICATIONS: size 16" deep, 5.5" high, 7" wide. 60 Watt power supply with 3 drive type power connectors, quiet 12 volt DC fan, LED power indicator, color matches CoCo. Holds 2 1/2 height hard or floppy drives and has card guided space for a PCB the size of a drive (like the WD1002-05 controller)

Floppy Drives (5.25" and 3.5" FLOPPY DISKS)

TEAC High Quality Drives - 1 Year Warr.

FD55B 360K 40 Track DS 5.25"	118.00
FD55F 720K 80 Track DS 5.25:	151.00
FD35F 720K 80 Track DS 3.5"	147.00

(Bare drives, requires case and power supply $75.00)

CoCo FHL High Speed Hard Drive Kits

Our top of the line system features Bruce Isted's interface for the Western Digital WD 1002-05 high speed controller. **Features**; fastest system available, 1 megabyte transfer in only 37 seconds!! Twice as fast as other systems! Supports 4 floppy and 3 hard drives, type ahead for **both** floppy and hard disk, **autoboot** OS9 L1 or L2 from hard or floppy disk. **Disadvantage**; does not support DECB. This is *the* system of choice for the serious OS9 user.

KIT INCLUDES: FHL HCA/WD High Speed interface, Hard drive with WD 1002-05 controller, ST506 cable set, 4 foot 40 pin cable, Hard Drive Case with 60 watt power supply and **fan**, OS9 software for LI and LII with source, Complete instructions. Easy one evening assembly.
(INTERFACE SPECIFICATIONS: Size is the same as a floppy controller. Interfaces the WD 1002-05 controller to the CoCo. This controller handles 3 hard and 4 floppy drives. Type ahead under OS9 for both floppy and hard drive. Includes OS9 LI and LII software with source. Autoboot ROM included to boot from floppy or hard drive. Supports OS9 only. 1 megabyte transfer in 37 seconds!)

1 YEAR WARRANTY ON ALL SYSTEMS!

NEW LOWER PRICES!!

20 Meg High Speed Kit Complete	*725.00
40 Meg High Speed Kit Complete	*825.00
70 Meg High Speed Kit Complete	1260.00
Assemble & Test any of the above add	60.00
OPTIONS:	
Floppy Drive (Mounted in case)	128.00
FBU Fast Hard disk Back Up	75.00

ORDERING INFORMATION VISA and M/C. NY residents add 7% sales tax. US shipping add $3.50. Please call for Air Express shipping.

Send for FREE FHL NewsLetter and catalog.
****Most of our software requires OS9 LII and 512K.**
*** New LOWER PRICES!!!**

Frank Hogg Laboratory, Inc.

770 James Street - Syracuse, NY 13203
Telex 646740

Call 315/474-7856

Frank Hogg Laboratory

12 Years of Service, Support, and Friendly Help!

OS9 Software

The WIZ

by Bill Brady

Did you ever wonder why there is only one really good communications package for OS9? The WIZ is so good that no one has been able to better it in over a year on the market! Simply the best package there is for OS9 and the CoCo III. **FEATURES:** Mac-Like interface with windows, text and binary upload/download with xmodem, kermit, on line HELP, AUTOLOGGING lets you dial up and log on to your favorite service, Macros, VT52 emulation, Usage log and much more.

The Wiz requires a RS232 Pak or similar device, LII and 512K. Supports the Owl-Ware Super I/O board.

The WIZ	79.95
Disto RS232 Pak	49.95

OS9 Users Group Disk Library

We have the complete **OS9 Users Group Library** available for immediate delivery. We pay the UG a royalty so you will be helping a worthy cause when you buy these disks. All the programs include source and some documentation. The 11 disk library is the best deal if you can read 80 track double sided disks. These disks are 720K each and are all almost full. That's almost 8 megabytes of programs for only $156! The individual disks are on 35 or 40 track disks and some are double sided. Call or send for the list.

OS9 Users Group Disks each (50+ disks)	10.00
Complete 11 disk library	156.00

Inside OS9 Level II

The Book by Kevin Darling

$39.95

Are your tired of playing games with Level II? Do you want to find out what's going on inside OS9? This is the book for you! Over 200 pages of hints, kinks, bugs, source listings and much more. Written by the well known Compuserve SysOp, Kevin Darling. 'Must reading' says Dale Puckett in Rainbow!

Sculptor

Sculptor is a applications language, commonly referred to as a 4th Generation Language. Basically this means that you can create applications in one tenth the time it would normally take. Sculptors screen and print formatting make screen displays and reports easy and fast. Sculptors B+ tree index system makes record lookup lighting fast. Programs are portable too.

Sculptor	249.00
Sculptor Special (If we have any left, (call))	149.00

DynaStar

Used by more OS9 users than any other!

FEATURES: Best OS9 editor/word processor/text formatter, has everything you would expect and more, supports terminals and windows simultaneously, auto-configurable, auto-indent for C and Pascal programming, mail merge for form letters, bug free, solid. New manual makes it easier to use than ever. Most popular word processor since 1982! Uses CoCo 3's windows for pop-up help menus, can be disabled. Two key sequence to move from anywhere to anywhere in your text. WordStar command style. Will work with files larger than memory. Merge function allows stringing many files together at print time. Full block manipulation, mark, move, copy, delete, read from disk, write to disk. **Keyboard Macros**: Define or redefine any control key (up to 29) to reproduce any key sequences, including commands! Macros can be read in at startup automatically or created on the fly as needed. **Printer Control**: Supports multiple printers via a print control file that transforms imbedded control characters to printer control characters. Changing printers is easy. **Formatting Commands:** Justification, word wrap, centering, headers, footers, macros, odd and even support, multiple index generation, multiple table of contents generation and more! *DynaStar* is the last word processor you will ever have to buy! Level I version also included on disk.

DynaStar word processor/formatter	150.00

DynaSpell

by Dale Puckett

102,000 and 20,000 word dictionaries included. Supports both Level I and II. Fast, slick, the best available for OS9. Written by Rainbowtech columnist Dale Puckett.

DynaSpell spelling checker	75.00
SPECIAL WHEN PURCHASED WITH DYNASTAR	25.00

ORDERING INFORMATION VISA and M/C. NY residents add 7% sales tax. US shipping add $3.50. Please call for Air Express shipping.

Send for FREE FHL NewsLetter and catalog.
****Most of our software requires OS9 LII and 512K.**

Frank Hogg Laboratory, Inc.

770 James Street - Syracuse, NY 13203
Telex 646740
Call 315/474-7856

Feature 32K ECB

The fourth in a series of tutorials for the beginner to intermediate machine language programmer

Machine Language Made BASIC

Part IV: Getting Graphic

By William P. Nee

With this article we start to explore the Color Computer's best capability: the speed and ease with which it can create graphics. The standard way to begin any graphics program is with PMODE, PCLS and SCREEN. These three commands, along with PCLEAR, will set certain locations within the memory. The main locations we will use for graphics and their meanings are shown in Figure 1.

When you first power up, the computer assumes PCLEAR 4, PMODE 0, PAGE 1, and sets the addresses as indicated under START. Since PMODE 0,1 uses only the first graphics page, the computer assumes that you will be using $600 to $C00-1 for graphics ($E00 to $1400-1 with disk). If not, you must tell the computer something different. The three main graphic commands in machine language are shown in Figure 2.

Nothing is as easy as it looks. If you try these commands, your machine language program will become lost. The problem arises between the PCLS command and where *EDTASM+* stores the program. On power-up with *EDTASM+*, Location $FF/100 is #$600; this is where the edit buffer (your typed-in program) and the symbol table will begin. Since graphics also begin at $600, a PCLS will set all graphic bits to 0 and,

---

Bill Nee bucked the "snowbird" trend by retiring to Wisconsin from a banking career in Florida. He spends the long, cold winters writing programs for his CoCo.

Location	Indicates	Start	W/Disk
$B6	PMODE (1 - 4)	(0)	(0)
$B7/B8	end of graphics page +1	(#$C00)	(#$1400)
$B9	bytes per line (#$10 or #$20)	(#$10)	(#$10)
$BA/BB	start of graphics page	(#$600)	(#$E00)
$BC/BD	(#$600 if not disk, #$E00 if disk)		

Figure 1

```
1) PMODE  LDB  #(0 - 4)    PMODE 0 to PMODE 4
          JSR  $9628
   PAGE   LDB  #(1 - 8)    PAGE 1 to PAGE 8
          JSR  $9653
2) PCLS   JSR  $9542       PCLS
3) SCREEN LDB  #(0 - 1)    graphics = 1, text = 0
          JSR  $95AA
          LDB  #(0 - 1)    color set 0 or color set 1
          JSR  $9682
```

Figure 2

Address	Description	PCLEAR4	W/Disk	PCLEAR8	W/Disk
$19/1A	basic starts @	#$1E01	#$2601	#$3601	#$3E01
$1B/1C	variables start @	#$1E03	#$2603	#$3603	#$3E03
$1D/1E	arrays start @	#$1E03	#$2603	#$3603	#$3E03
$1F/20	free memory @	#$1E03	#$2603	#$3603	#$3E03
$33/34	data statements @	#$1E00	#$2600	#$3600	#$3E00
$A6/A7	input buffer @	#$1E00	#$2600	#$3600	#$3E00

Figure 3

PCLEAR	1	2	3	4	5	6	7	8
W/Out Disk	0C	12	18	1E	24	2A	30	36
With Disk	14	1A	20	26	2C	32	38	3E

```
LDB  #$( * )     * use number from table above
STB  $19
 - OR -
LDB  #(1 - 8)    PCLEAR 1 to PCLEAR 8
LDA  #6
MUL
ADDB $BC         #$E00 if disk, else #$600
STB  $19
```

Figure 4

in the process, wipe out the buffer. To avoid this problem we must change the contents of $FF/100.

Graphic pages 1 to 4 are from $600 to $1DFF (with disk, from $E00 to $25FF), and we must put the edit buffer above graphics. Whatever number we put into Location $FF/100 must end in 00 and allow enough room for the text program before the `ORG` address. Let's use $2800 for the buffer address at $FF/100. This will allow locations $2800 to $3000 for the text and symbols and leave $3000 and up for the assembled program. This is done in the following manner:

1) insert *EDTASM+* cartridge and power up
2) press Z and ENTER to get into *ZBUG*
3) press W and ENTER to read two bytes at a time
4) type `FF/` to look at $FF/100
5) type `2800` and press ENTER to change to #$2800
6) type `GC006` and press ENTER to execute $C006 (keeps $FF/100 the same)

The assembler will now store the written program and symbols in a buffer starting at $2800. You can actually read the program in the "A" mode starting at $2A00. The "S" stack starts at the buffer location plus #$177, decreasing from there.

The next problem arises if you try to use '5' to '8' in the `PAGE` command at $9653. Since the computer is set only for `PCLEAR 4`, any higher number will give you a Function Call error message. To avoid this, we must `PCLEAR` some more pages. The BASIC `PCLEAR` command affects the addresses shown in Figure 3.

These numbers change as your BASIC program increases and becomes more complicated, but their initial value is assigned by the `PCLEAR` you select. So, in machine language, any `PCLEAR` must be put at least into Location $19. Either the program or table shown in Figure 4 can be used to get the `PCLEAR HEX` value you desire.

The second method, while a few bytes longer, is preferable because it will recognize whether or not disk is being used.

If you want to use `PCLEAR 8`, the *EDTASM+* buffer must begin at $3600 ($3E00 with disk) or higher. The program must execute at an address even higher — generally the length of your text program plus an additional 200 bytes. The *EDTASM+* will give you a Bad Memory error message if you try to write your program over the execution address. If it does, increase the `ORG` location until it is above the text portion of your program.

The program for this article is in machine language only. It can be executed entirely from *ZBUG* and will break when you hit any key without losing the program. Initially, Location $FF/100 is set to #$3E00 to get above disk graphics; the program will `ORG` at $4382 to leave room for the editor buffer and symbol table. Once you've typed in the program, switch to *ZBUG*. In the "A" mode you can follow the program and symbols from $4000 to $4381. That is why the program must `ORG` at least at $4382.

Once the program has been checked for errors, you can examine the buffer locations in the "W" mode for the following information.

SPECIAL DEAL ON 500 PROGRAMS IS BACK!

BACK BY POPULAR DEMAND! GET OUR LATEST 50 DISKS OR TAPES FULL OF OVER 500 PROGRAMS. HERE IS WHAT YOU'LL RECEIVE:

★Over 250 Utility/Home Application Programs including a Word Processor, Database, Spreadsheet, Disk Utilities, Business Software, Electronics Series, Educational Programs for Kids, plus much more!

★Over 200 exciting games including King Pede, Kron, Star Trek, Flight Simulator, Wizard, Horse Races, Football, plus much more.

★Over 30 adventures including Rambo, Haunted House, Power Sword, Skid Row, plus 32k graphic adventures.

Individual issues sell for $9⁰⁰ each or $450⁰⁰ for all 50. We slashed the price to only $150⁰⁰!

REG. $450 NOW $150⁰⁰

★★THIS MONTH ONLY★★

Buy this package of 500 programs and receive a free 6 month subscription.

VISA

RAINBOW CERTIFICATION SEAL

COOL DOWN TO OUR SUMMER PRICES ON SUBSCRIPTION SOFTWARE

THERE IS NO BETTER WAY TO ENJOY THE SUMMER THAN TREATING YOUR COLOR COMPUTER TO 10 READY-TO-RUN PROGRAMS EACH MONTH. GET 12 DISKS OR TAPES A YEAR CONTAINING OVER 120 QUALITY PROGRAMS. A SUBSCRIPTION TO T & D SOFTWARE CONSISTS OF 10 READY-TO-LOAD PROGRAMS DELIVERED BY FIRST CLASS MAIL EVERY MONTH.

NO, WE ARE NOT THE SAME AS THE RAINBOW ON TAPE. IN FACT, MANY SUBSCRIBERS HAVE WRITTEN IN AND SAID THAT WE ARE MUCH BETTER THAN RAINBOW ON TAPE!

PRICES

	TAPE OR DISK	THIS MONTH ONLY
1 YEAR (12 issues)	~~70.00~~	60.00
6 MO. (6 issues)	~~40.00~~	35.00
1 ISSUE	~~9.00~~	8.00

Michigan Residents Add 4%
Overseas Add $10 to Subscription Price
Personal Checks Welcome!

- ★ Available on COCO 1, 2, and 3
- ★ Includes Documentation
- ★ Over 4,500 Satisfied Customers
- ★ Back Issues Available From July '82 (Over 720 Programs)

TURN TO PAGE 122 & 123 FOR A COMPLETE LISTING

MasterCard

PLEASE SPECIFY TAPE OR DISK

T & D SUBSCRIPTION SOFTWARE, 2490 MILES STANDISH DR., HOLLAND, MI 49424 (616) 399-9648

Location	
buffer start +02	program end +1
+0E	symbols start at
+10	symbols end at
+40	"S" stack location
+9F	text start
+A5	text end
+A9	text start
+AB	text end

The location in Buffer +10 plus 1 will give you the lowest ORG location that will not conflict with the buffer.

Using the EQU command makes typing in routine addresses unnecessary and makes the program easier to follow. Eight pages are cleared; the program is set for PMODE 3,1; PCLS. The screen is filled, then displayed with SCREEN 1,1. The program switches to PMODE 3,5 and then fills and displays the screen. The action keeps alternating until you hit any key — JSR ($A000). When you do, the computer is reset for text screen and the program ends. In *ZBUG*, type FINISH = to see that the program ends at $43DA. Type FINISH - PCLEAR +1 = to get the length of the program, which is #$59 bytes.

A good technique to prevent the slight flicker on the graphics screen when alternating pages is to fill the screen first, then display it with the SCREEN command. This also gives the best animation effect. Since the program starts with PCLEAR, type GPCLEAR or G4382 to execute it. The END must be followed with PCLEAR.

You are not limited, by the way, to eight graphic pages of #$600 bytes each as long as you have enough memory to go higher without running into the edit buffer or the assembled program. The PCLEAR table continues in Figure 5. Generally, though, PCLEAR 12 is the highest you will use. The buffer must start at least at $4E00 ($5600 with disk) and execute even higher (text programs plus symbol length plus #$200).

(Questions or comments concerning this tutorial may be directed to the author at Route 2, Box 216 C, Mason, WI 54846-9302. Please enclose an SASE when requesting a reply.) ☐

PCLEAR	9	10	11	12	13	14	15	16	17	18
W/Out Disk	3C	42	48	4E	54	5A	60	66	6C	72
With Disk	44	4A	50	56	5C	62	68	6E	74	--

Figure 5

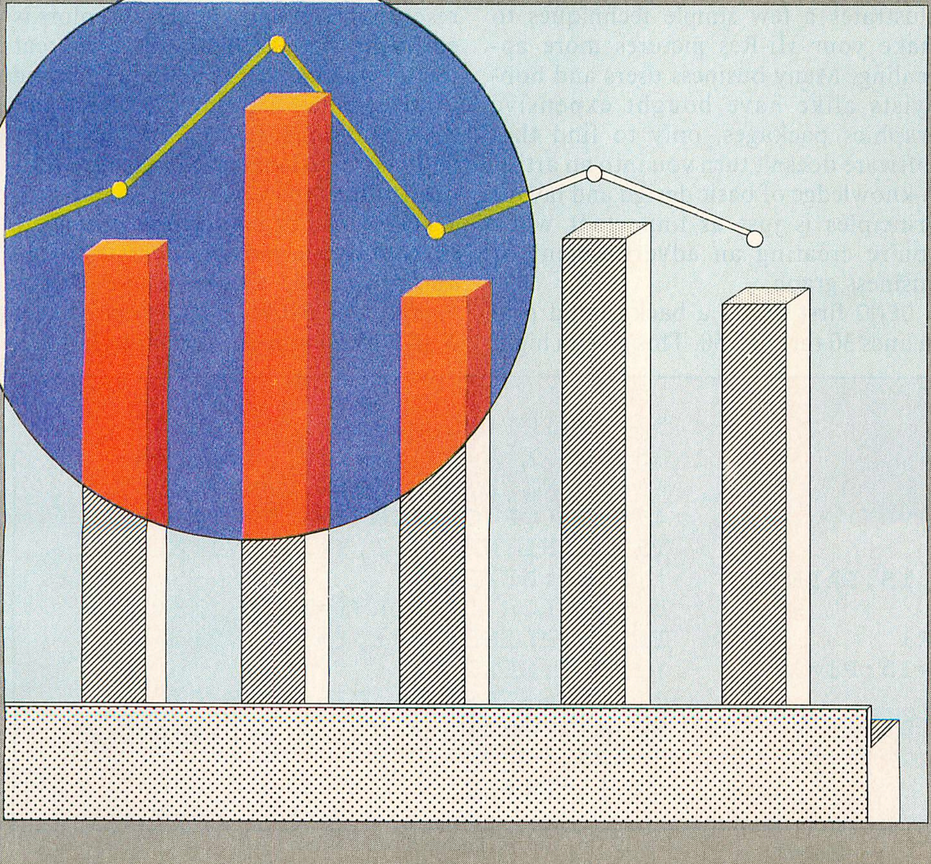
The listing: PAGER

```
                                                      EDTASM+/01.00.00    PAGE 1

                    00050 *  $FF/100=#$3E00
4382                00100          ORG     $4382
          9628      00110 PMODE    EQU     $9628
          9653      00120 PAGE     EQU     $9653
          9542      00130 PCLS     EQU     $9542
          95AA      00140 SCREEN   EQU     $95AA
          9682      00150 CSET     EQU     $9682
4382 C6   08        00160 PCLEAR   LDB     #8        FOR 8 PAGES
4384 86   06        00170          LDA     #6        #$600 BYTES PER PAGE
4386 3D             00180          MUL
4387 DB   BC        00190          ADDB    $BC       WITH OR WITHOUT DISK?
4389 D7   19        00200          STB     $19       WHERE BASIC WOULD START
438B C6   03        00210          LDB     #3        PMODE 3
438D BD   9628      00220          JSR     PMODE
4390 C6   01        00230 PAGE1    LDB     #1        PAGE 1
4392 BD   9653      00240          JSR     PAGE
4395 BD   9542      00250          JSR     PCLS
4398 9E   BA        00260          LDX     $BA       START OF GRAPHICS ON PAGE 1
439A CC   0000      00270          LDD     #0
439D ED   81        00280 LOOP1    STD     ,X++
439F C3   0003      00290          ADDD    #3
43A2 9C   B7        00300          CMPX    $B7       END OF GRAPHICS ON PAGE 1
43A4 25   F7        00310          BLO     LOOP1
43A6 C6   01        00320          LDB     #1
43A8 BD   95AA      00330          JSR     SCREEN    DISPLAY THE SCREEN
43AB C6   01        00340          LDB     #1
43AD BD   9682      00350          JSR     CSET      COLOR SET 1
43B0 C6   05        00360          LDB     #5        PAGE 5
43B2 BD   9653      00370          JSR     PAGE
43B5 BD   9542      00380          JSR     PCLS
43B8 9E   BA        00390          LDX     $BA       START OF GRAPHICS ON PAGE 5
43BA CC   0000      00400          LDD     #0
43BD ED   81        00410 LOOP5    STD     ,X++
43BF 83   0003      00420          SUBD    #3
43C2 9C   B7        00430          CMPX    $B7
43C4 25   F7        00440          BLO     LOOP5
43C6 C6   01        00450          LDB     #1
43C8 BD   95AA      00460          JSR     SCREEN
43CB C6   01        00470          LDB     #1
43CD BD   9682      00480          JSR     CSET
43D0 AD   9F A000   00490 DONE     JSR     [$A000]
43D4 27   BA        00500          BEQ     PAGE1
43D6 5F             00510          CLRB
43D7 BD   95AA      00520          JSR     SCREEN
43DA 3F             00530 FINISH   SWI               RTS IF IN BASIC
          4382      00540          END     PCLEAR

00000 TOTAL ERRORS
```

Add many more than four colors in HSCREEN 4, plus some techniques to put more style and depth into your graphics

Breaking the Four-Color Barrier

By Rusty Cutchin



Several years ago, as a yearbook editor for two trade associations of electronic technicians, I had the idea of putting the two groups' logos on the cover of the yearbook via the hot new medium of computer graphics. I programmed the designs at home on my CoCo 1 with good old `PMODE 4` commands (and lots of artifact colors). But what I remember most about the project was transferring the program's variables to the Zenith Z-100 computer at the office and watching the designs come up in glorious 640-dot-wide resolution and 16 colors. Imagine — diagonal lines became lines instead of staircases, and circles became circles instead of Ferris wheels!

As a part-time layout artist I came to appreciate detail and resolution as much as — perhaps more than — color. Now that the CoCo 3 supports 640-by-192 graphics, I've been surprised to see that the excellent programmers writing graphics editors for the CoCo 3 are sticking with what is essentially a wide `PMODE 4` screen (`HSCREEN 2`) in order to conveniently access 16 colors. This probably has something to do with the number of CoCo users not yet using RGB monitors, without which mixed

---

Rusty Cutchin is a former editor of Cashbox, *the record-industry newspaper. He owns Bass Hit Productions, which produces records and markets music software for the CoCo.*

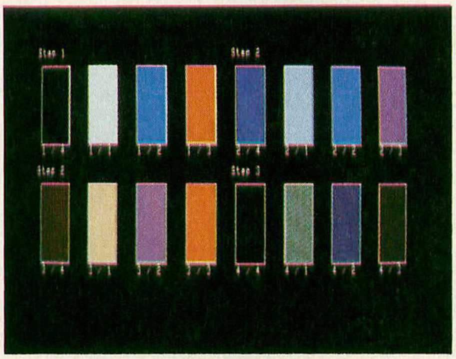
text and graphics in the highest resolution leaves a lot to be desired.

For those of you who *do* have an RGB monitor and don't mind spending a little extra time for more professional-looking results, particularly in business-oriented graphics, I have a couple of programs to easily get many more than four colors in HSCREEN 4, plus some techniques to put more style and depth into your graphics.

These techniques are not sophisticated, and anyone with a rudimentary knowledge of Enhanced BASIC can duplicate and expand on them. Creating new colors is simply a matter of using alternating vertical lines of different colors to create a new color. In HSCREEN 4, the distance between lines is so narrow that a new color or shade is created by the two adjacent lines.

Listing 1, NUCOLORS, illustrates this. After setting up the screen and variables, the program uses the HLINE command to draw 16 boxes on the screen and fill these boxes with lines of different colors to create new colors and shades. The program tells you the step rate of the line loops used, as well as the two color codes that make up the new color in each box. I chose black, white, blue and red as the four default colors in Line 10. As neutral and primary colors, they create the secondary colors purple and gray and pleasing lighter or darker shades of themselves. You can substitute yellow for white and create different shades of green and orange, as well as browns or any other shade that can be created out of four colors.

How you control the actual color depends on the palette colors you use and the step rate of the line loops in lines 45 and 50, where the vertical lines are actually drawn. The step rate 'S' (distance between vertical lines of one color) is initially set to 1 in Line 20, so that the first four boxes will contain the default colors just as if you had set them with HPAINT. If you set 'S' to '2' in Line 20, the first four boxes will have new colors in them. 'S' will increase by 1 in Line 65 for the next four boxes, returning to a value of 2 in Line 70 for boxes 9 through 12 unless you change these lines. When you leave more than two lines of space between lines being drawn (Step 3 or higher), the area begins to look more like vertical lines than solid colors. If you modify the program by adding another line loop before Line 45 or 50 to use three colors instead of two to make up your new color, however, you'll need Step 3 or higher. NUCOLORS tells you the step rate you're using (above the box), as well as the color codes (below the box).



But how to use these new colors practically, and how to fill areas other than boxes? Listing 2, DEMO, draws a dual business graph, creates a pie chart and bar graph using these new colors, adds colored text to the screen, and illustrates a few simple techniques to make your Hi-Res pictures more appealing. Many business users and hobbyists alike have bought expensive graphics packages, only to find that software doesn't turn you into an artist. A knowledge of basic design and layout principles is just as important when you're creating an advertisement or business graph.

DEMO first draws a background grid in lines 30 through 50. This gives a high-tech look to your design from the outset, and though a little overused in broadcast graphics, is still effective. It's kept in a darker color so it will stay a *background* design. Then in lines 60 through 130, the program creates two gray background boxes containing shadowed white boxes in which are printed the questions our graphs will answer. The outer box, the inner box and its shadow have given the graphics some 3-D depth with just a few commands. In lines 40 through 190 we use another default color to print the background data for our bar graphs. Notice that we always erase just enough of the blue grid before drawing something new in its place. This keeps images from interfering with each other and also highlights foreground designs.

In Line 200 the real fun begins. We create a blank box in Line 210 that we fill with new colors by going to the subroutine at Line 500 to draw our alternating colored lines. The subroutine at Line 600 draws the circle for our pie chart (Line 225). Then at lines 230 and 240 we call a subroutine to clean up the area outside our circle and presto — a new shape with two colors not in our default HSCREEN 4 palette! The rest of the program uses the lines subroutine (Line 500) to give us new colors for our bars, a new section for our pie chart and text to finish things up.

As you can see, a professional-looking graph or picture with full resolution and more than four colors is easily available, thanks to the great features of the CoCo 3. Here's hoping those talented 6809 programmers out there will enhance their fine products with a professional graphics editor that fully utilizes the CoCo 3's capabilities!

(Questions or comments concerning these programs may be addressed to the author at 1313 Cricket Lane, Woodbridge, NJ 07095. Please enclose an SASE when requesting a reply.) ☐

Listing 1: NUCOLORS

```
 1 'NUCOLORS
 2 'BY RUSTY CUTCHIN
 5 '
 10 PALETTE1,63:PALETTE2,15:PALET
 TE3,38:PALETTE0,0
 15 HSCREEN4:HCLS4:HCOLOR1
 20 C1=1:C2=4:S=1:A=15:B=15:P1=1:
 P2=10
 25 FOR Y=15 TO 110 STEP 95
 30 FOR T=1 TO 2
 31 S$=STR$(S)
 32 HPRINT(P1,P2-10),"Step"+S$
 35 FOR X=A TO (A+240) STEP 80
 40 HLINE(X,Y)-(X+48,Y+64),PSET,B
 45 HCOLOR C1:FORV1=X TO (X+45) S
 TEP S:HLINE(V1+2,Y+1)-(V1+2,Y+63
 ),PSET:NEXTV1
 50 HCOLOR C2:FORV2=X TO (X+45) S
 TEP S:HLINE(V2+1,Y+1)-(V2+1,Y+63
 ),PSET:NEXT V2
 51 C1$=STR$(C1):C2$=STR$(C2)
 52 HCOLOR1:HPRINT(P1,P2),C1$+" /
 "+C2$
 54 P1=P1+10
```

CoCo Graphics Designer $29.95

GARAGE SALE
SAT & SUN APRIL 12-13
34 HILLTOP LANE GREENLAWN
COMPUTER FAIR JULY 24
GET YOUR TICKETS TODAY!
DANGER
DO NOT ENTER
MOON UNIT
THIN MUFFIN
HAPPY

The Coco Graphics Designer produces beautiful Greeting Cards, Banners, and Signs for holidays, birthdays and other occasions.

The program features picture, border, and character font editors, so that you can modify or expand the already built in libraries. Plus a special "grabber" utility is included to capture areas of high resolution screens for your picture library.

Requirements: a Coco I, II or III with at least 32K, one disk drive, BASIC 1.0/1.1,ADOS 1.0/1.1 or JDOS. Printers supported include: Epson RX/FX, Gemini 10X, SG10, NX10, DMP 100/105/110/130/430 CGP220, many Okidata (check with Zebra), Seikosha GP100/250, Gorilla Banana, Legend 808. **Order #C323 Coco Graphics Designer $29.95.** Ordering Instructions: All orders add $3.00 Shipping & Handling. UPS COD add $3.00. VISA/MC Accepted. NY residents add sales tax.

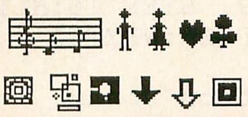
Zebra Systems, Inc., 78-06 Jamaica Ave.
Woodhaven, NY 11421 (718) 296-2385

Orders shipped same or next day!

Optional Font Disks A, and B, Picture Disks 1, 2, 3 and 4 (some samples shown here) $14.95 each.

Font Disk A

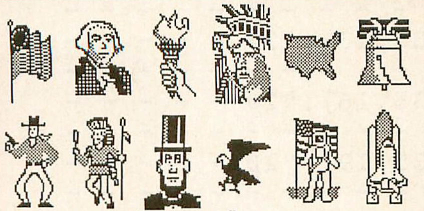
BANNER
BOLD3
DIGITAL
SHADOW
STENCIL
STRIPES
TYPE
VARIETY
WESTERN



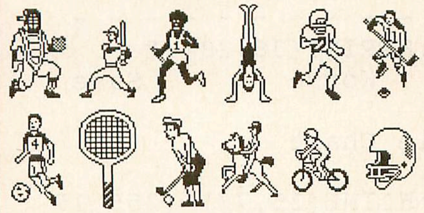
Font Disk B

ARCADE
ALIEN
BAROQUE
BAROQUE2
BLOCK
COMPUTER
CIRCLE
CIRCLE2
CUBE
CUBE2
DECO
GRAY
SCRIPT
SCRIPT2

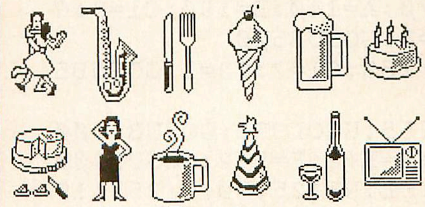
Samples From Picture Disk #2



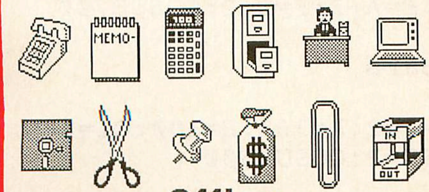
America



Sports

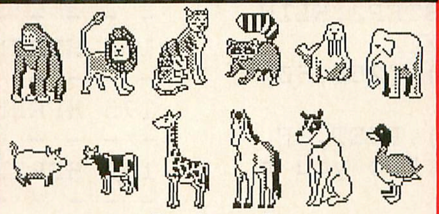


Party

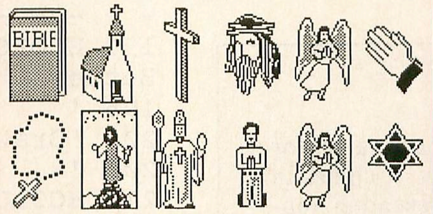


Office

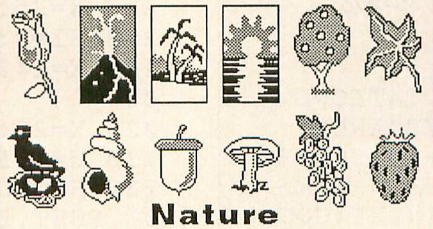
Samples From Picture Disk #3



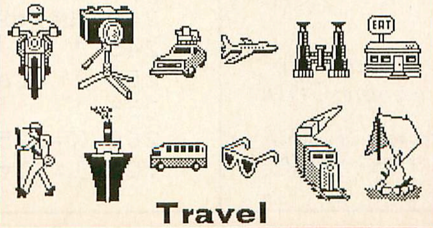
Animals



Religion

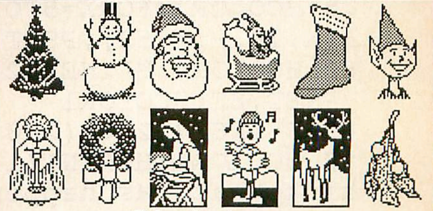


Nature

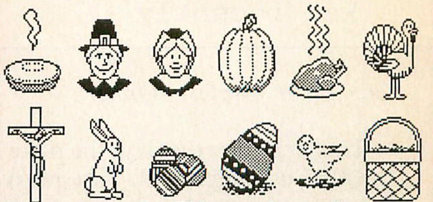


Travel

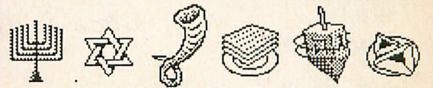
Samples From Picture Disk #4



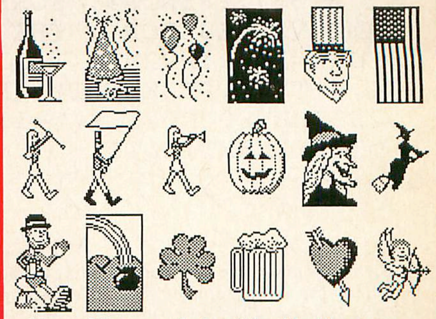
Christmas



Easter & Thanksgiving



Jewish Holidays



New Years, July 4th, Halloween, Parades, St.Paty's & Valentine's

```
55 C2=C2+1:IFC2=5THENC2=1
60 NEXTX
65 S=S+1
66 A=A+320:C1=C1+1:NEXT T
70 S=2:A=15:P1=1:P2=22:NEXTY
75 GOTO 75
```

110	206	410	174
180	23	END	73
285	77		

Listing 2: DEMO

```
10 PALETTE0,0:PALETTE1,63:PALETT
E2,38:PALETTE3,15
20 HSCREEN4:HCOLOR3
21 '
30 'Draw Grid
35 '
40 HLINE(0,0)-(639,191),PSET,B
45 FORG1=41TO639 STEP40:HLINE(G1
,0)-(G1,191),PSET:NEXTG1
50 FORG2=0TO191 STEP 16:HLINE(0,
G2)-(639,G2),PSET:NEXTG2
55 '
60 'Draw Question Boxes
61 '
65 HCOLOR4:HLINE(0,0)-(280,10),P
SET,BF
70 HCOLOR1:HPRINT(0,0),"WHAT AME
RICANS THINK OF THE ECONOMY
75 HCOLOR1:FORX=5TO260STEP2:HLIN
E(X,19)-(X,52),PSET:NEXTX
80 HCOLOR4:HLINE(12,24)-(255,50)
,PSET,BF:HCOLOR1
85 HLINE(7,22)-(250,48),PSET,BF
90 HCOLOR4:HPRINT(1,3),"Do you t
hink what has happened
95 HPRINT(1,4),"to the stock mar
ket recently
100 HPRINT(1,5),"will lead to a
recession?
105 HCOLOR1:FORX=285TO560STEP2:H
LINE(X,19)-(X,52),PSET:NEXTX
110 HCOLOR4:HLINE(292,24)-(558,5
0),PSET,BF
115 HCOLOR1:HLINE(287,22)-(553,4
8),PSET,BF
120 HCOLOR4:HPRINT(36,3),"Do you
 think the national economy
125 HPRINT(36,4),"is getting bet
ter, getting worse,
130 HPRINT(36,5),"or staying abo
ut the same?
135 '
140 'Print Bar Graph Data
145 '
150 HCOLOR4:FORX=281TO639STEP40:
HLINE(X,64)-(X,190),PSET:NEXTX
155 FORY=64TO191STEP16:HLINE(281
,Y)-(638,Y),PSET:NEXTY
160 HCOLOR2:HPRINT(35,7),"50 - -
 - - - - - - - - - - - - - - - -
 - - -
165 HPRINT(35,10),"40 - - - - -
- - - - - - - - - - - - - - - -
170 HPRINT(35,13),"30 - - - - -
- - - - - - - - - - - - - - - -
175 HPRINT(35,16),"20 - - - - -
- - - - - - - - - - - - - - - -
180 HPRINT(35,19),"10 - - - - -
- - - - - - - - - - - - - - - -
185 HPRINT(35,22)," 0 - - - - -
- - - - - - - - - - - - - - - -
190 HCOLOR1:HPRINT(38,23),"
Better        Worse       Same
195 '
200 'Draw Pie Chart
205 '
210 HCOLOR1:HLINE(25,70)-(255,19
0),PSET,B
215 X=25:Y=70:A=140:B=190:C1=3:C
2=2:S1=2:S2=2:GOSUB500
220 X=140:A=255:C1=2:C2=1:GOSUB5
00
225 X=25:A=255:HCOLOR1:GOSUB 600
230 H=4:P=1:E=X+2:F=Y+2:GOSUB700
235 HCOLOR4:HLINE(25,70)-(255,19
0),PSET,B:GOSUB 600
240 H=4:P=4:E=A-2:F=B-2:GOSUB700
245 '
250 ' Draw Bars
255 '
260 X=325:Y=142:A=365:B=180:C1=4
:C2=1:S1=1:S2=2:GOSUB500
```

One-Liner Contest Winner . . .

This one-liner displays the poke and peek values for the CoCo 3 keyboard. Just press a key. It comes in handy when you're working on key-repeating routines.

On Coco 3 Misc disk.

The listing:

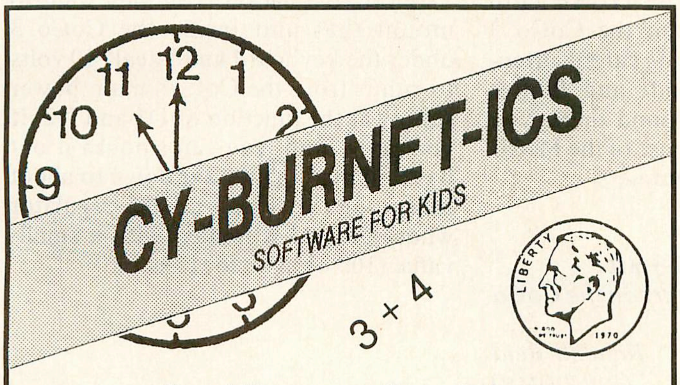
```
0 CLS
1 W=337:PRINT@0,"POKE LOCATIONS
AND VALUES FOR  THE KEYBOARD";:
FORT=1TO8:PRINT@(W-336)+(T*32)+6
4,W+T"=",PEEK(W+T):IFPEEK(W+T)<>
255THENSOUNDPEEK(W+T),1:NEXT:GOT
O1ELSENEXT:GOTO1
```

? ? ? ?

Larry Lim
Cincinnati, OH

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

```
265 X=366:Y=151:A=406:C2=3:S2=3:
GOSUB 500
270 X=430:Y=97:A=470:C1=4:C2=1:S
2=2:GOSUB500
275 X=471:Y=87:A=511:C2=3:S2=3:G
OSUB 500
280 X=535:Y=62:A=575:C2=1:S2=2:G
OSUB500
285 X=576:Y=67:A=616:C2=3:S2=3:G
OSUB500
290 '
300 'Draw Graph Key
305 '
310 X=315:Y=62:A=335:B=70:C2=1:S
2=2:GOSUB500
315 Y=72:B=80:C2=3:S2=3:GOSUB500
320 HCOLOR1:HPRINT(43,8),"Before
 the plunge
325 HPRINT(43,9),"After the plun
ge
330 '
350 'Finish circle
355 '
360 HCOLOR4:HLINE(M1,M2)-(M1-R,M
2+10),PSET
365 HLINE(M1,M2)-(M1,M2+R),PSET
370 PT=3:HPAINT(M1-2,M2+4),PT,4
375 HCOLOR1
380 HPRINT(10,13),"Yes
385 HPRINT(10,14),"31%
390 HPRINT(6,18),"Don't Know/
395 HPRINT(7,19),"No Answer
400 HPRINT(10,20),"19%
405 HCOLOR4:HPRINT(23,15),"No
410 HPRINT(23,16),"50%
415 GOTO 415
420 '
500 'Fill boxes to make new colo
rs (SR)
505 '
510 FORV1=X+1TOA-1 STEP S1:HCOLO
RC1:HLINE(V1,Y+1)-(V1,B-1),PSET:
NEXTV1
515 FORV2=X+2TOA-1 STEP S2:HCOLO
RC2:HLINE(V2,Y+1)-(V2,B-1),PSET:
NEXTV2
520 RETURN
525 '
600 'Draw circle (SR)
605 '
610 M1=X+((A-X)/2):M2=Y+((B-Y)/2
):R=(A-X)/2
615 HCIRCLE(M1,M2),R-2:RETURN
620 '
700 'Clean circle border (SR)
705 '
710 HPAINT(E,F),H,P
715 RETURN
```



—Dual Program Specials—

- TIME/MONEY $39.95
- ADDITION/SUBTRACTION $39.95
- MULTIPLICATION/
  BEAT THE COMPUTER $21.95

supports CoCo 1, 2, & 3
specify cass/disk/Network II
school P.O.s welcome
add $2.00 shipping and handling
Network orders add $10.00 per disk
Write for Free Catalog

CYBURNETICS
CYBURNETICS
CYBURNETICS

3 × 8 = 24

5705 CHESSWOOD DR.
KNOXVILLE, TN 37912
615-688-4865

3 × 5 = 15

WIN THE LOTTO

WITH YOUR HOME COMPUTER!

Use your home computer and Soft-Byte's amazing new **"Lotto Program"** to get more winning tickets.

In just seconds this software analyzes past winners and produces a powerful probability study on easy-to-read charts. With a single press of a key, you'll see trends, patterns, odds/evens, sum totals, number frequencies, and much more. It also includes automatic number wheeling, instant updating, and a built-in tutorial.

Ask your software dealer.

APPLE, IBM, and Commodore............$24.95
Atari, Radio Shack......................$21.95
MacIntosh $29.95
Back-up Copies..........................$3.00

Add $2.00 shipping and handling. Credit card orders approved by phone and shipped same day.

Make checks payable to **SOFT-BYTE** and mail to:

P.O. Box 556 Forest Park
Dayton, Ohio 45405

Soft-Byte
513-278-1110
VISA
MasterCard

COCO Q&A CONSULTATIONS

By Marty Goodman
Rainbow Contributing Editor

In this and in future "CoCo Consultations," I will be trying something new. In addition to the familiar Q & A column, I will also include tidbits of information contributed by various folks and, in some cases, comment on the information. Thus, even if you don't have a question, *I invite you to send in any little hints or descriptions of experiences you have had with the CoCo that you think might be of interest to the CoCo-owning public in general.*

Using the CoCo 3's MMU

Where would I get the information needed to properly use the MMU of the CoCo 3 to access all 512K of memory via assembly language?

Brian O'Neill
Kirkland, WA

The best reference for that is the service manual for the CoCo 3. This book, which costs about $14 and can be ordered from the people at your local Radio Shack store (they will have to call Tandy National Parts to order it for you), is the reference that all commercial CoCo 3 software developers use. After a bit of time spent experimenting to clear up a few minor ambiguities in the information there, any assembly language programmer should be fully able to use the MMU of the CoCo 3. If you need to see some examples of its use, however, you might want to order a copy of Spectral's *Super Extended BASIC Unravelled* from Microcom. This is a complete, commented disassembly of the ROM in the CoCo 3 that includes a guide to the GIME chip similar to that found in the CoCo 3 service manual. By paying careful attention to the start-up code and Hi-Res screen handling code found there, you will see examples of the use of the MMU by Microware's programmers.

CoCo 3 Cold Start

How do I do a cold start on the CoCo 3?

Randall Reid
(RANDOMR)
Wiarton, Ont.

From BASIC you can type `POKE &H71,0:EXEC&HBC1B` and press ENTER. This resets the cold start flag at $71 (the same flag used by the CoCo 1 and 2) and then jumps to the special CoCo 3 cold start sequence. That special CoCo 3 cold start routine was "snuck in" on top of what used to be the (unusable) `DLOAD` command. In fact, you can accomplish the same thing by typing `POKE &H71,0:DLOAD` and pressing ENTER! Of course, you can also just hold down the CTRL and ALT keys, press the reset button, then release those keys and press the reset button again. But then you have to gaze briefly at the ugly faces of the "three mugateers."

A Sound Deal

I'm using a NEC Multisync monitor with my CoCo 3 and get an exceptionally crisp, sharp image. But the NEC Multisync doesn't have an audio input. Can you recommend a means of getting sound out of the CoCo 3?

Lewis Kurfist
(LEWKAY)
Parkridge, NJ

The back of the CoCo 3 has an RCA phono-type audio output jack. You can connect that to the Aux or Line Input of any nearby hi-fi system and get sound that way. Or, you can buy a $12 Radio Shack "speaker amplifier" (Cat. No. 277-1008) and hook that to the CoCo 3 via a cable that has an RCA phono plug at one end and a ⅛-inch mini phono plug at the other. This "speaker amplifier" requires a 9-volt battery, but you may be able to run it off a battery eliminator if the eliminator in question has sufficiently cleanly-filtered DC power so as to prevent a nasty hum in the amplifier.

If you're a hacker, you may want to mount that unit inside the CoCo 3 under the keyboard and "steal" 10 volts to run it from the CoCo's main power supply at the junction of D1 and D2. If you get a hum, you can smooth it out by regulating that power down to about seven volts by using a 7805 regulator whose ground is floated with a small-value (100 ohm or so) resistor.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

The COCO hardware store

CRC COMPUTERS

Fantastic Super Controller II

DISTO SUPER CONTROLLER II

- **Radio Shack/Tandy controller compatible.**
- **Works on all COCOs - 1, 2 or 3 with or without Multi-Pak Interface.**
- **One 24/28 pin socket for 8K ROM, 2764, or 27128 EPROM.**
- **Internal MINI-EXPANSION-BUS connector for one DISTO Super Add-On.**
- **Low Power draw; within COCO's requirements.**
- **Gold Plated edge connectors.**
- **Under OS-9:**
  - Buffered Read/Write sector achieved without halting the CPU.
  - Continual use of keyboard even while reading or writing to disk.
  - System's clock no longer looses time during Read & Write.
  - NMI is blocked and transferred to IRQ in software for low CPU overhead.
  - Completely Interrupt driven for fast & smooth Multi-Tasking operations.
  - Drivers written by KEVIN DARLING

$130.

DISTO Super Controller I

$99.95

A Superb Controller. Along with the included C-DOS, plug-in three more software selectable DOSes or 2764 or 27128 EPROMs burned to your liking.

The Internal Mini-Expansion-Bus lets you add some incredible features to the controller. Disto Super Add-Ons were designed to fit neatly inside the controller case.

NEW DISTO 3in1 Multi-Board Adapter

$59.95

This Muti-Board is an adapter that plugs in any Disto Super Controller, Ramdisk or MEB Adapter.

It includes a new and improved Printer Port (Centronics compatible), a faster Real Time Clock (works at 2MHz.) and a true RS-232 Serial Port (external 12 volt AC adapter required). DB25 cable included.

It fits neatly inside the metal case and is still within Tandy's power limits. It also works with or without a Multi-Pak.

NEW DISTO RS-232 SuperPack

$49.95

- A Stand-Alone (Multi-Pak required) adapter that gives the user a true RS-232 Serial Port.
- Completely compatible with OS9's ACIA software.
- Compatible with software that requires the Tandy Deluxe RS-232 Pack.
- DB-25 cable included.

DISTO SUPER ADD-ONS

- **Real Time Clock & Printer Interface** **$39.95**
  Have the Real Time, Date and Year displayed on your screen at a simple command.
- **Mini EPROM Programmer** **$54.95**
  A LOW COST EPROM Programmer that attaches directly to any Disto Super Controller or MEB adapter to program those often used utilities.
- **Hard Disk Interface** **$49.95**
  A Hard Disk Interface fully compatible with SASI controller. Fits inside the Super Controller, Ramdisk or MEB Adapter. OS-9 drivers included. Also available with RS-232 Serial Port.
- **Super RAM 3 ZeroK Board** **$CALL**
  Now is the time to upgrade your COCO 3 to 512K of memory. Just add the memory chips and install in your COCO 3.
- **MEB Adapter** **$24.95**
  A Stand-Alone Mini-Expansion-Bus in which you can plug any other Disto Adapter directly in a Multi-Pak without the need for a Super Controller or Ramdisk.

4in1 Super Board

Coming this fall to a dealer near you

Real Time Clock, Printer Port, RS-232 & Hard Disk Interface all in one neat package

CRC COMPUTERS INC.

10802 Lajeunesse, Montreal,
Quebec, Canada H3L 2E8

1-514-383-5293

We accept phone orders • Call for Canadian Prices
Include S&H of $4 or $8 if order exceeds $75

Master Card and Visa Accepted

Sorry: No personal cheques

See You At Princeton RAINBOWfest!

Three do-it-yourself fixes for the hardware hacker

Quick Fixes

By Marty Goodman

Each of the following three discussions present information to enable hardware tinkerers to make inexpensive repairs and upgrades to their CoCo equipment. These three projects have the following in common: They address widespread problems with CoCo systems; they take no more than an hour or two to complete; they require little hardware construction expertise; and the total cost of parts for any of the projects is under $5.

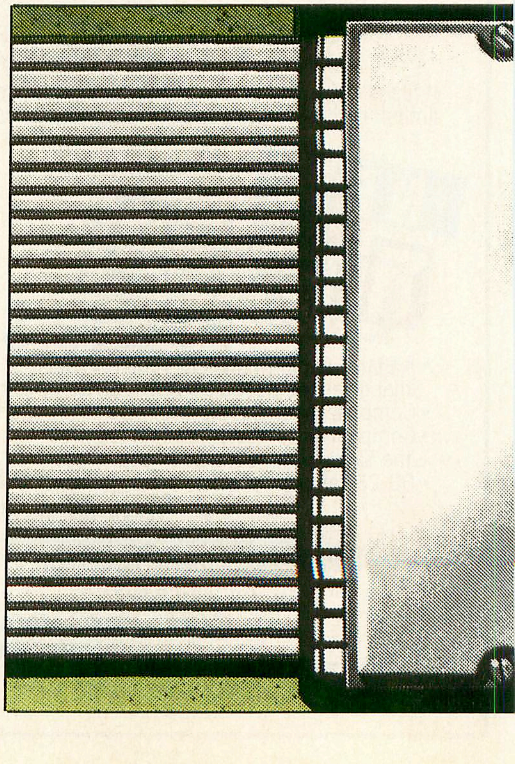
Although the information will not be presented in a strictly *for-the-beginner* fashion, anyone with modest experience building electronic projects should be able to follow these instructions. Indeed, only one of the three projects requires that you even read a schematic diagram.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

Project One: Sparklies

Many CoCo 3 users have complained of "sparklies." These are little linear flashes of light that appear on a monitor screen some — or all — of the time. Generally, OS-9 Level II users with RGB monitors and 512K of memory report seeing them during disk I/O, but they have been reported by Disk Extended BASIC users on monochrome monitors — even appearing when the disk is not in operation. These are caused by subtle timing problems between the GIME chip and the DRAM chips it needs to address.

Until recently the only known ways to cure the problem were complex, tedious, expensive or all three. You could buy a different brand of DRAMs for your upgrade board, replace the old (1986) GIME chip with a newer variant (1987) of that chip. You could also unsolder your 68B09E chip, replace it with a socket, and insert a 6309E (Hitachi-made CMOS version of the 6809E) in that socket. The DRAM chip and GIME chip replacements cost $180 and $50, respectively. The 6309E chip costs $12 to $25, is difficult to get and, because the replacement process requires the removal of the CoCo motherboard and the unsoldering of a 40-pin chip, is a viable alternative only for the



most experienced and well-equipped hardware tinkerer.

History of the Fix

In March of this year, Roger Krupski of RGB Systems reported some startling news on Delphi: He had found a way to cure the sparklies with a quick, cheap modification. Roger was experimenting with various-length Y cables on his system (something I have repeatedly warned RAINBOW readers *not* to do) and found that when he added a cable to the system, his sparklie problem got worse. He then decided to manipulate the system-timing in a simple, direct way. He hooked an AM radio-type, 10- to 365-pF variable capacitor in parallel with C10, (a timing fudge factor/RFI suppression capacitor present on the E clock). In this manner, he could *tune out* the sparklies. When he had his long Y cable hooked up, it took more capacity to tune out the sparklies than when he was not using the cable. Roger examined the waveform with his 100-MHz oscilloscope and found that his modification removed some of the overshoot in the E clock waveform and smoothed out a *jog* in the middle of it. It also shifted the time constant for that E clock fudge factor circuit that Tandy had provided.

After considerable experimentation, observation and measurement, Roger arrived at the modification that seemed to work best. A few other tinkerers on Delphi who had sparklie problems tried it and reported considerable success in curing them. Of course, the following suggestion is still *quite* experimental. It *is* possible that such manipulation of the clock timing could cause problems (including decreased system reliability.) I recommend that *only* those CoCo 3 owners with serious sparklie problem try the following fix, and I urge those who try it to report to me, in care of RAINBOW, what success they have with the fix.

The Fix

The fix that worked best for Roger is as follows:

Remove R9 and R10 from the CoCo 3 motherboard and replace those 47-ohm resistors with 100-ohm resistors. Then remove C10 and C11 from the board and replace those 39-pF capacitors with 100-pF capacitors.

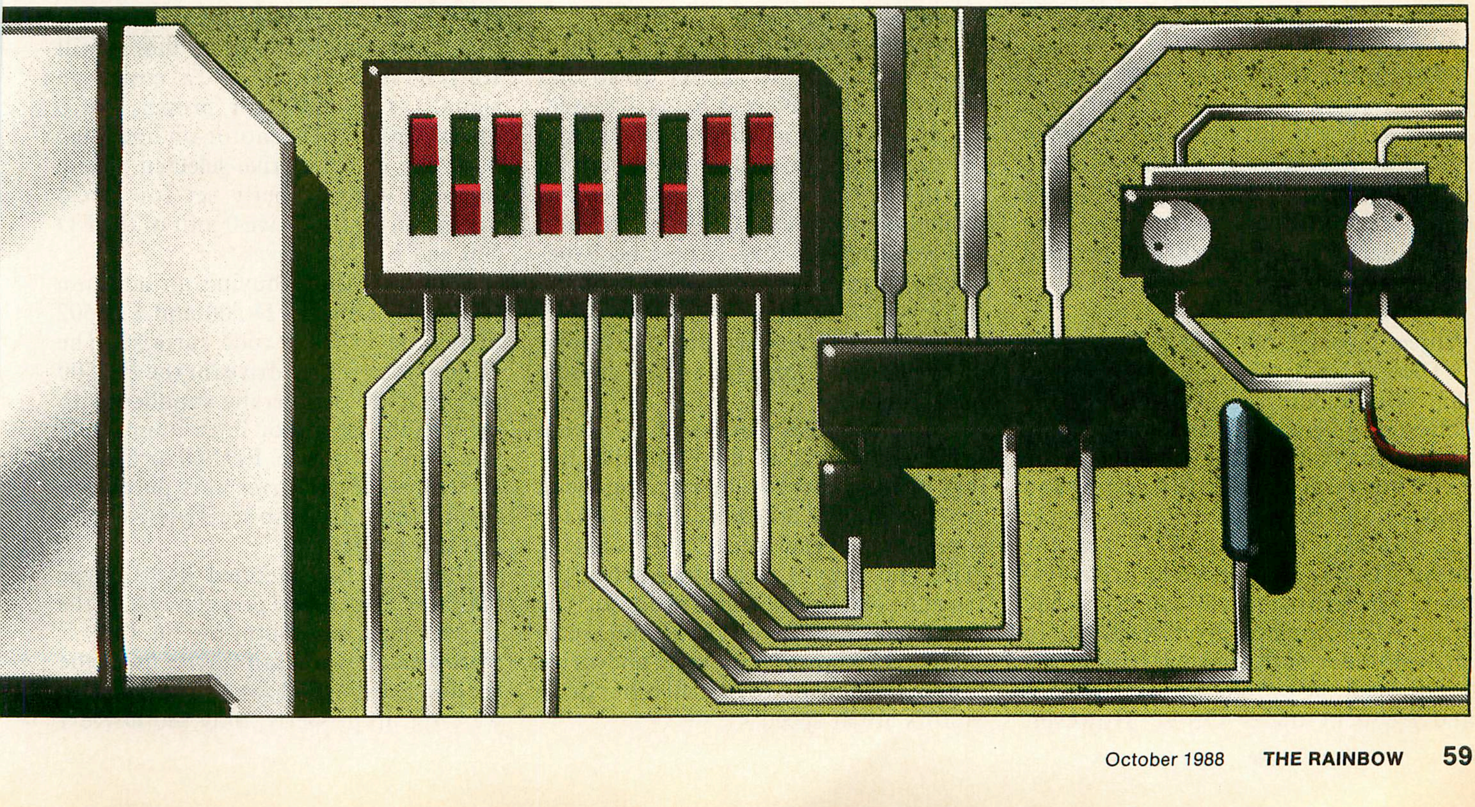
Help with the Details

With the computer open in front of you, R9 and R10 are the two small, side by side cylinders just in front (front = toward the keyboard) and near the left-hand corner of the GIME chip (the 64-pin, square, socketted chip). On the CoCo motherboard, they are clearly marked R9 and R10 in white silk-screened letters. Each has yellow, purple and black color-bands. Remove and replace these resistors with 100-ohm resistors. The resistors may be purchased at Radio Shack, Cat. No. 271-1311, 271-152 or 271-012. While any one of these three will work, the first (No. 271-1311) will probably fit best physically in the space available.

C10 is a tiny green blob located behind the GIME chip, to the left of a prominent black cylindrical electrolytic capacitor (C9). C11 is an identical tiny green blob located near the right-hand edge of the board, to the left of the front screw that holds down the 40-pin system bus connector. It, too, is located to the left of a prominent black cylindrical electrolytic capacitor (C27), and immediately to the left of the resistor R11. Both of these capacitors are clearly labeled on the motherboard as C10 and C11 in white silk-screened lettering. Remove both capacitors and replace them with 100-pF capacitors (Radio Shack Cat. No. 272-123).

Your total parts cost for this project should be under $2.

If the sparklies are *not* completely cured (or at least considerably lessened), put things back the way they were. Although you will probably destroy the original resistors and capacitors you removed, replacement parts are available at Radio Shack (Cat. No. 271-009 for the 47-ohm resistors; Cat. No. 272-121 47-pF cap will do to replace



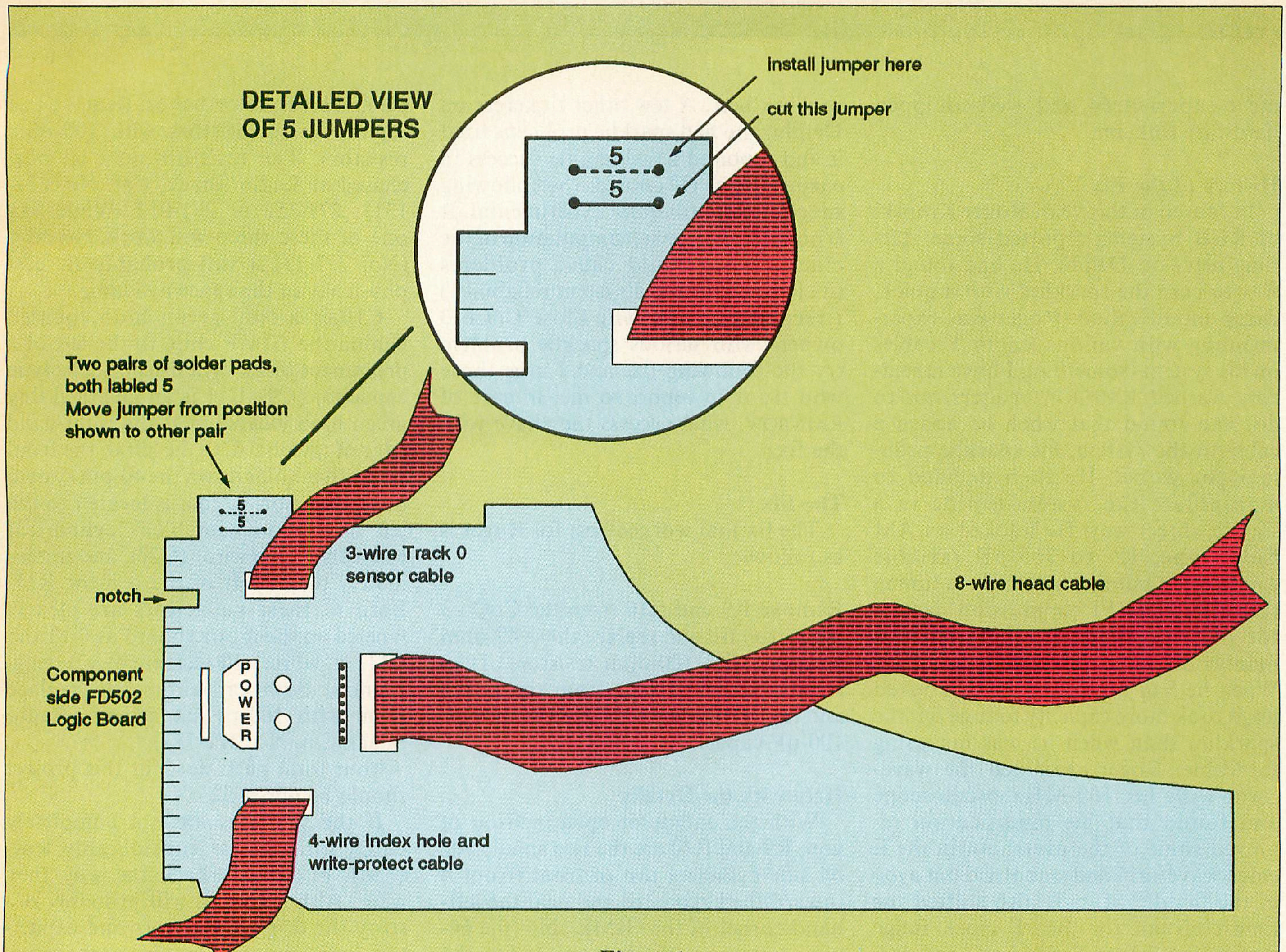

DETAILED VIEW OF 5 JUMPERS
install jumper here
cut this jumper
5
5
Two pairs of solder pads, both labled 5
Move jumper from position shown to other pair
5
5
notch
3-wire Track 0 sensor cable
8-wire head cable
Component side FD502 Logic Board
POWER
4-wire Index hole and write-protect cable

Figure 1

the original 39-pF cap). If the sparklies are not *quite* cured, you might want to experiment with different capacitor values. Try values ranging between 50 and 500 pF.

Remember that opening the case of the computer voids any warranty you might have with Tandy, and that Tandy repair services *does* reserve the right to refuse to repair computers that, in the opinion of the repairperson who sees the machine, are butchered beyond repair by their owners.

Project Two: FD 500/FD 502 Drive Fix

There is a potentially *serious* problem that will plague some owners of the newest disk drive systems sold by Tandy for the CoCo. This problem *only* occurs if you buy *both* your Drive 0 system and your second drive from Radio Shack, and you own a model FD 500 or the latest FD 502 double-sided drive systems. The problem will cause crashed disks when copying from Drive 0 to Drive 1 under both Disk BASIC and OS-9 (although the problem is more serious and frequent under OS-9). However, there *is* a simple hardware fix for the problem.

Essential Background

By convention, the disk drive hardware for the CoCo was set up so that when any *one* drive was being accessed, the drive spindle motors on *all* drives in the system are on. All software written for the CoCo, especially the Disk Extended BASIC and the OS-9 Levels I and II operating systems, expect such behavior. This convention differs from the conventions of other PC Compatible, hardware. There, when any one floppy disk is accessed, *only* that disk's spindle motor spins.

Now, because CoCo's disk-access software expects all drive spindle motors in the system to be running when any one drive is accessed, if you tell the computer to read something from one drive and copy it to another drive, the system software will *not* wait for the motor on the other drive to come up to speed. (It knows you have one drive running and assumes that all other drive motors are at speed.)

The Tandon TM65L type drives used in the FD 500 CoCo drive system and the drives used in the FD 502 double-sided CoCo drive system have *jumpers* that determine if the drive motor will start in response to *just* a motor-on signal (as required for proper CoCo operation) or if the motor-on line must be active *and* the drive selected. These jumpers were properly set for CoCo operation on the Drive 0 unit of the FD 500 and FD 502 drives.

However, those buying an addition (Drive 1) to their FD 500 and FD 502 drives are in for a rude surprise. The Tandy stock-added drive for the FD 500 and FD 502 is generally supplied with incorrectly set motor logic jumpers. If you own a two-drive FD 500 or FD 502 system, and *both* drives were purchased from Tandy, check to see if your system has this problem.

Under Disk Extended BASIC, type `POKE &HFF40,2` and press ENTER. If the Drive 1 light *and* motor are on, there is a problem that you can correct using the fix described as follows. (If your drives were set up properly, only the Drive 1 light — not the motor — would go on.) You can also check this problem by opening your drive case to see the spindle motors of both drives, typing `POKE&HFF40,9` and pressing ENTER. Drive 0's drive light will go on, and its motor should go on, too. If the the spindle motor for Drive 1 does *not* go on as well, you will need to correct this with the fix described below.

The FD 500 Fix:

Open the drive case and expose the bare Drive 1 drive. You may need to completely remove it, disconnecting the 34-pin connector and the four-wire power connector and removing the two screws holding it to the case. Look on the drive's circuit board for three staking pins arranged in a 90-degree angle and labeled JP 7. If pins B and C are jumpered, you have found the problem. Remove the jumper that connects pins B and C, and shift it so that it joins pins A and C. If your drive is a different version, you may have to hunt for the jumper that correctly affects the motor's operation. Look for a jumper with zero resistance to Pin 16 (motor status) of the drive's 34-pin connector.

The FD 502 Drive Fix:

The FD 502 drive is a bit more complicated to fix. The FD 502 drive's motor logic control jumper is *soldered* in, and the jumper is relatively inaccessible, requiring that you not only remove the drive from the case, but that you also partly or completely remove the logic control board from the bare drive to gain access to the right jumper.

Open up the disk drive case and remove the top (Drive 1) drive (see Figure 1). This will entail removing four screws to open the case, the four-wire power connector and the 34-wire edge card connector from the drive and the two screws that hold the drive in place.

Next, look at the component side of the drive's printed circuit logic board. The component side has prominent cylindrical electrolytic capacitors and a number of connectors attached to it. (The underside of that board has some surface-mount resistors and capacitors soldered to it.) Position the board so that the edge connector is facing you, and the little notch in that connector is to your left. You must now identify three connectors.

To the left of the four-wire power connector's original position is a connector that hooks to a three-wire mylar cable going to the Track 0 detect sensor. Further back and to the right of the power connector is a four-wire mylar cable that plugs into the circuit board, carrying Index-Hole and Write-Protect detector information. Behind the four wire power connector, some cylindrical capacitors and some bare staking pins, is an eight-wire mylar connector that carries signals from the drive motor's heads to the logic board. You will probably have to remove all three of these cables at their logic board connection.

These three mylar cables are attached to little white connectors that, in turn, plug into mating connectors on the circuit board. Do *not* tear the mylar when removing these connectors. Note, too, that the mylar is *not* plugged directly into the connector, as is the case with the CoCo keyboard connector. It is *bonded* to a connector, which mates to another connector that is soldered to the PC board. Do not try to pull the connector out by the mylar ribbon. Try using a jewelers' screwdriver to carefully remove those connectors.

COCO
ACCESSORIES

Hardware

2 Drive System(2 DSDD Drives in one case)* $329.95
Drive 1 Upgrade(1 DSDD for your 26-3129 or 3131) Specify Catalog# when ordering !! $119.95
Drive 0-SSDD Full Height* $209.95
Drive 1-SSDD Full Height $135.95
COCO 3 512K Upgrade $219.95
COCO 3 Keyboard $34.95

Epson LX-800 Printer $219.95
180 CPS - DRAFT
30 CPS - NLQ
3K BUFFER
REQUIRES SERIAL TO PARALLEL INTERFACE

Software & Misc.

Art Deli(440 Pix on 10 disks) $99.95
COCO Graphics Designer $29.95
ADOS - $29.95 ADOS 3 - $39.95
Serial to Parallel Converters $54.95
FKEYS III - $19.95 Sixdrive - $19.95
Telewriter 64 - $59.95 COCO-Util - $39.95
Gauntlet - $28.95 Pyramix - $24.95
Disto Super Controller $99.95
COCO in Stitch (X-Stitch Patterns)- $ 3.95

*Specify R.S. or Disto Controller.

The Computer Center

IF YOU DON'T SEE IT, ASK US !

ALL DISK DRIVES CARRY A 90 DAY WARRANTY.

5512 Poplar Ave. Memphis, TN 38119 901-761-4565

Add $4.00 for Shipping & Handling. VISA, Master Card, & Money Orders Accepted.
Allow 3 Weeks for personal checks, NO CODS. Prices may change without notice.

After you have removed these three connectors, you will find three hold-down screws that attach the printed circuit board to the disk drive. Remove these, and lift out the printed circuit board from the drive.

To the left and behind the notch that marks Pin 2 of the 34-pin connector, you will see two pairs of pads on the circuit board labeled '5'. While the right pair is jumpered, the left pair is not. Remove the jumper from the right pair of pads, and solder one across the other pair of pads.

Put the drive back together, attach the connectors and reinstall the drive in the cabinet.

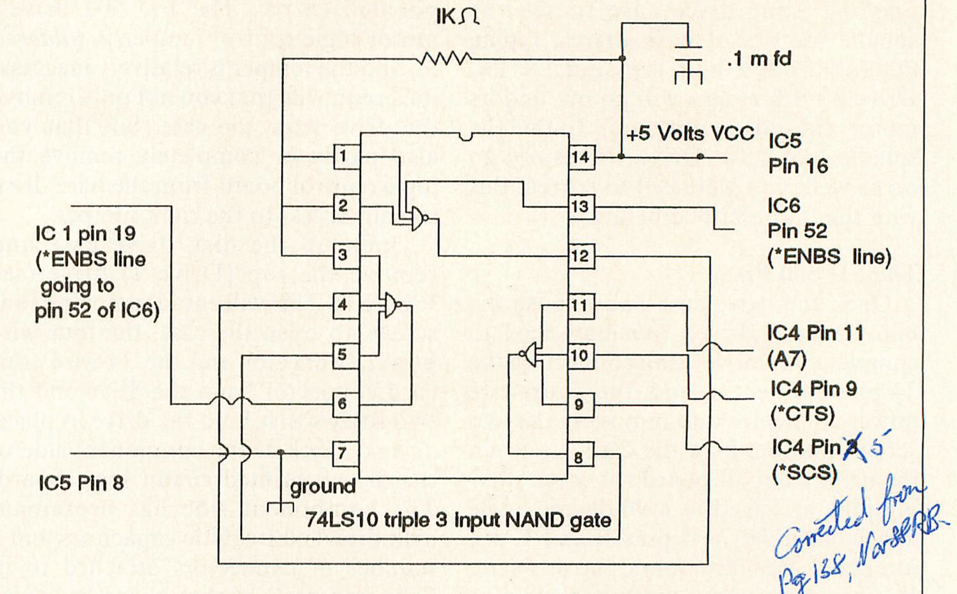
Testing Your Work:

From Disk BASIC, type `POKE &HFF40,2` and press ENTER. The Drive 1 light should come on, but *none* of the motors should go on. While `POKE &HFF40,8` should cause *both* motors to go on, *none* of the drive lights should go on. `POKE&HFF40,10` should cause both motors and the Drive 1 light to go on, and `POKE &HFF40,0` should turn everything off. If your system behaves in that fashion, you've fixed it properly. If it behaved in that fashion originally, you should *not* attempt to fix it.

Thanks to Kevin Darling (KDARLING) of Raleigh, NC. Kevin was, to my knowledge, the first person to discover the FD 502 drive problem. Kevin was developing driver software for Tony DiStefano's No Halt Controller using a two-drive FD 502 system and kept running into problems. Eventually, he discovered the improperly jumpered FD 502 Drive 1 unit. It was an impressive detective job. Kevin later collected reports that the FD 500 system had a similar problem. Thanks, also, to Glen Hathaway (HATHAWAY) who informed me of the JP 7 on his Tandon TM65L jumper and its effect on the motor logic.

Project Three: Multi-Pak Upgrade

As I wrote over a year ago, Tandy has recommended that owners of all Multi-Pak models who want to use them with a CoCo 3 must upgrade them. At present, I am uncertain whether the upgrade is required for the new Multi-Paks (Cat. No. 26-3124), but still recommend it be done. Some of the Cat. No. 26-3134 Multi-Paks currently sold have an 'A' suffix after the catalog number (26-3124A), and have the upgrade board already installed. Those with older Cat. No. 26-3124 Multi-Paks should read on for instructions on how to make up and add this upgrade board themselves.



Be sure to also cut the trace on the printed circuit board of the Multi-Pak that connects Pin 19 of IC1 to Pin 52 of IC6

Figure 2: Upgrade for Multi-Pak

The needed upgrade for the older Multi-Pak (Cat No. 26-3024) was easy. You obtained a new PAL chip for it, and replaced the old, socketted PAL chip in the Multi-Pak with this new one. For a while, that upgrade PAL chip was available through Tandy National Parts. More recently, National Parts has refused to provide that part to end users. However, the part is still available from third-party CoCo retailers, such as Microcom.

Owners of the smaller, newer (Cat. No. 26-3124) Multi-Paks faced a more difficult upgrade. A Satellite Board had to be ordered from National Parts and then properly installed. This board is currently hard to get, and the instructions for its installation that I provided over a year ago are also dated, because those old instructions were keyed to particular wire colors. Tandy has since changed the wire colors of the upgrade board, making my original instructions nearly useless.

One of our members on Delphi took the trouble to "reverse engineer" the Multi-Pak Satellite Board upgrade and post a schematic for it. The upgrade consists of a *single*, 35-cent small scale TTL logic chip, a 10-cent deglitching capacitor and a 5-cent resistor. With the information provided in the schematic diagram (Figure 2) and a small printed circuit board, hardware tinkerers should be able to do their own upgrade for a fraction of the cost charged by Tandy repair.

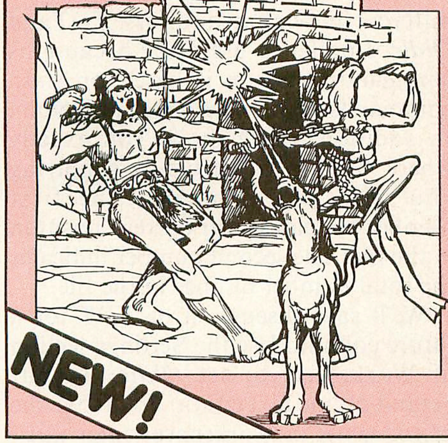
Those who would attempt this upgrade must be sure to first *cut* the trace that connects Pin 19 of IC 1 to Pin 52 of IC 6 on the printed circuit board of their Multi-Paks. Note that IC 6 is a monster square integrated circuit. It is a custom chip made *just* for the Multi-Pak. Note, too, that its pins are smaller than those of the other ICs — soldering to Pin 52, as called for in the upgrade, can be a delicate matter. Skill and fine tips on your soldering iron are both essential.

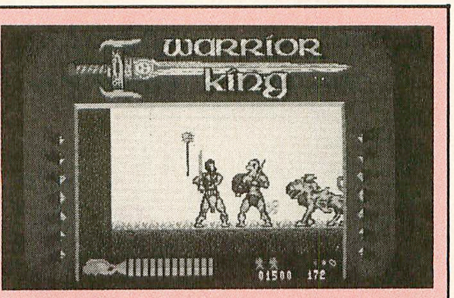
The schematic diagram shows the 74LS10 (triple three input NAND gate) IC with its pins arranged as they actually are on the chip, but it also shows what the pins connect to internally. This upgrade turns off the Multi-Pak's data bus when addresses that have Bit 7 set are presented to it. This protects the GIME chip registers from bus conflicts with any I/O devices plugged into the the Multi-Pak that try to use addresses greater than $FF7F. Addresses accessed via the *CTS line ($C000 through $DFFF) and the *SCS line ($FF40 through $FF5F) are unaffected.

Thanks to Jim Johnson (REINDEER), who provided this information.

SUNDOG SYSTEMS

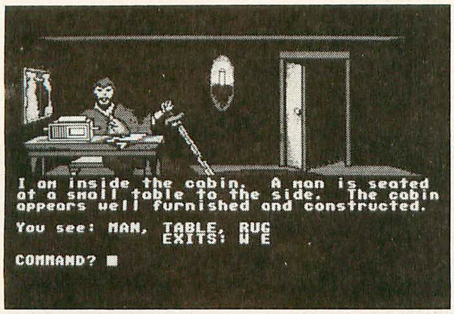
Warrior King





Become RASTANN, Warrior King, on the quest to regain his rightful crown, hidden deep within a sinister land. Battle monsters, gain magic and weapons, and travel through harsh wilderness and dark castle dungeons in this medieval realm. From the creator of *Kung-Fu Dude* comes this awesome arcade game for the CoCo III! *Warrior King* uses the most detailed 320x200 16 color graphics and high speed machine code to vault you into a world of fantasy. Dare ye challenge the many perils ahead in order to become WARRIOR KING? Req. 128K CoCo III, disk drive, and joystick. Only $29.95.

In Quest of the Star★Lord



```
I am inside the cabin.  A man is seated
at a small table to the side.  The cabin
appears well furnished and constructed.
You see: MAN, TABLE, RUG
               EXITS: W E
COMMAND? ■
```

This is THE graphic adventure for the CoCo III! Unparalleled 320x200 animated graphics will leave you gasping for more! You quest for the Phoenix Crossbow in this post-holocaust world of science and fantasy. *In Quest of the Star Lord* is a full 4 disk sides of mind-numbing adventure! Req. 128K CoCo III and disk drive. Only $34.95. Hint Sheet: $3.95.

"A dynamite program! The best graphics I've seen to date on the CoCo III. You have to see it to believe it."

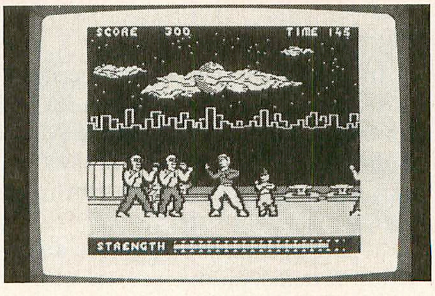
— 8/88 Rainbow review

Kung-Fu Dude

An exciting arcade game. The BEST karate game ever created for the CoCo! Destroy opponents and evade obstacles as you grow ever closer to your ultimate objective. Spectacular graphics, sound effects, and animation! Req. 64K CoCo, disk drive, and joystick. Only $24.95.

"The CoCo karate gap has been filled and Kung-Fu Dude *does it excellently. I highly recommend it!"*

— 2/88 Rainbow review



All programs CoCo 1, 2, 3 compatible, unless otherwise stated

Sundog Systems
21 Edinburg Drive
Pittsburgh, PA 15235
(412) 372-5674

HALL of the KING TRILOGY

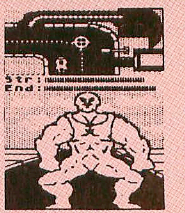
The epic adventure is back! The largest adventure campaign ever seen for the CoCo is again available! A total of six disks of intense graphic adventure will have you playing for weeks! Each section is a two-disk stand alone adventure, but all three together form an epic saga. Quest for the legendary Earthstone in the ancient dwelling of the dwarves while you enjoy the classic graphics that made this trilogy famous! Each adventure can be purchased separately for $29.95, the lowest price ever, or you can purchase the entire set for only $74.95! Req. 64K CoCo and disk drive.

"One of the best adventures I have experienced to date!" — 6/86 Rainbow review

"The animated graphics are dramatic, detailed, and excellent!" —11/87 Rainbow review

"The adventure of a lifetime. Don't miss out!" — 7/88 Gamer's Connection review

CHAMPION



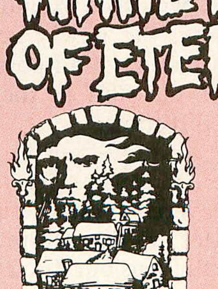
Become a superhero in this unique 64K action adventure. Great graphics and sound effects! See 5/87 Rainbow review. Disk $19.95.

DRAGONBLADE

Another great 64K animated adventure! Can you obtain the enchanted sword to slay the evil dragon? See 11/86 Rainbow review. Disk $19.95.

DRAGONBLADE

WHITE FIRE OF ETERNITY



Enter the era of monsters and magic in this splendid 64K animated adventure! See 12/86 Rainbow review. Disk $19.95.

Personal checks, money orders, and American C.O.D. orders accepted. Include $2.50 for S/H. $3.00 extra for C.O.D. orders. PA residents add 6% sales tax. Authorship and dealer inquires welcome.

Lower rates, expansion and online editing

Time for a Change

By Cray Augsburg
Rainbow Technical Editor

Those who have been using Delphi for a year or so may be familiar with the Delphi Advantage plan. Essentially, this plan offers reduced rates for members who guarantee to use at least $24 worth of online time each month. Now Delphi has reduced Advantage Plan usage rates to $4.80 per online hour. Figure 1 shows a comparison between Delphi Advantage rates and the hourly rates of two other services.

To sign up for the Delphi Advantage, enter `USING ADVANTAGE` at the Main> prompt on Delphi. There is a one-time entry fee of $19, and you must commit to using at least $24 of online time each month (unused portions of the $24 do not carry forward to the next month.) The $24 usage commitment is applied at the beginning of each month. Many of you probably use Delphi quite a bit more than this already. A quick review of your account should be all that is necessary to determine if the Delphi Advantage would be beneficial to you.

In addition to the reduced access rates, Delphi Advantage members receive the monthly Delphi newsletter and a monthly summary of usage. The plan is open to all members in good standing (no outstanding accounts). You can cancel online anytime you decide the plan is not helping you.

A New Development

Through an agreement with Dave Thomas (MORTIMER), Falsoft, Inc., publishers of THE RAINBOW and PCM, now manages the Portable Place SIG on Delphi. PCM has covered the Tandy portables for more than five years now. While PCM's magazine coverage of portable computers will still exclude non-Tandy products, the newly acquired SIG welcomes users of all portables. Good luck to the staff as they embark in this new direction.

Oldie, But Goldie

Last month we covered some useful applications of files in the Delphi Workspace. Now, let's focus our discussion on the files themselves or, rather, the text editors used to create them.

In the past, we have used the `CREATE` command to build text files online. This is OK for simple notes. But what if we want to correct mistakes in longer files? The `CREATE` command only lets us write the file. Once a file is saved, the only way to make corrections is to retype the entire file. Here is where Delphi's online text editors really come in handy.

Delphi offers a choice between two different line-oriented editors: *EDT* and *Oldie*. I prefer to use *Oldie* because its command structure is based on slash commands as are other areas of Delphi. In addition, *Oldie* shows you exactly where you are in the file by supplying you with two numbers. The first number indicates your current position in the file. The second number indicates the total number of lines in the file.

We'll save discussion of *EDT* for a future column. Use the Settings section of Workspace to set *Oldie* as your default online text editor. To invoke the editor while in Workspace, enter `EDIT` *filename*. Listed below are the commands available with *Oldie*. Please note the slashes are used as delimiters in the command lines. They *are* required.

- `/APPEND/`*string*`/` adds the text *string* to the end of the current line.

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

Database Report

By Don Hutchison
Rainbow CoCo SIG Database Manager

This month in the CoCo SIG, we've got some great graphics that I'm sure you will enjoy.

OS-9 Online

In the General topic of the database, Keith Alphonso (ALPHASOFT) uploaded a text file describing Alpha Software Technologies' BBS system. Jim Johnson (REINDEER) sent in an article about creating a customized system disk that boots up into an 80-column text window.

The Utilities topic includes Bill Brady (OS9UGED), who posted a file management utility called `Runner`, and John Beveridge (JOHNTORONTO), who uploaded a program to remove the first block from files sent in CoCoBin format by the *Wiz*.

In the Patches topic, Chris Burke (COCOXT) sent us a patch to correct a bug in the `Rename` command of *EZGen* Version 1.04. Chris also uploaded an *EZGen* script to fix an error processing bug in Version 2.2b of the Burke & Burke `BBFHDisk.dr` hard disk driver. Kevin Darling (KDARLING) uploaded an 80-column patch for *TS/Edit*, provided by Bob Santy.

In the Telcom topic, Merle Kemmerly (TOOK3) uploaded Version 3.0.0 of *Telstar*, a terminal program for the CoCo 3 under Level II OS-9. Bill Brady uploaded the `WizAcia` device driver and `M2w` descriptor (the ACIA port driver used by the *Wiz*). Bill also posted the source code for the SuperBoard version. Warren

Time Period	Speed	Delphi Advantage[1]	CompuServe[2]	GEnie[3]
Evenings/Weekends	2400 bps	$4.80/hr	$12.75/hr	$12.50/hr
Evenings/Weekends	1200 bps	$4.80/hr	$12.75/hr	$5.00/hr
Evenings/Weekends	300 bps	$4.80/hr	$6.25/hr	$5.00/hr
Daytime	2400 bps	$12.60/hr	$12.75/hr	$42.50/hr
Daytime	1200 bps	$12.60/hr	$12.75/hr	$35.00/hr
Daytime	300 bps	$12.60/hr	$6.25/hr	$35.00/hr

1) Delphi Advantage evenings/weekends rate via Tymnet, Telenet or Direct Dial. Daytime Advantage rate via Tymnet. Daytime Direct Dial is $8.40/hr and for access via Telenet is $16.20/hr. International pre-paid rate is $7.20/hr at all times. Higher rates for access from some locations. Go to USING ADVANTAGE online for details.

2) CompuServe access via CompuServe network. Add $10 to daytime rate and $2 to evenings/weekend rate for access via Tymnet and Telenet.

3) GEnie access via GEISCO network at half-duplex only.

Figure 1: Service access rates as of August 1, 1988.

J.A.C

JOYSTICK
ALTERNATIVE
CONTROLLER
with **RAPID FIRE**

ARCADE-TYPE ACTION
CONTROL USING YOUR
ATARI-TYPE JOYSTICK.
SPECIAL PRICE $4 OFF
REG. $22.50

$18.50

"UNIQUE RAPID FIRE OPTION"

STOP $14.95

SAVE TIME ON PAUSE! OUR ORIGINAL PAUSE CONTROL PLUGS INTO YOUR MULTI-PAK, Y-CABLE, OR PROGRAM SLOT. PAUSE ANY COMPUTER FUNCTION AT THE TOUCH OF A BUTTON.

$14.95

4-TECHS — NEW HORIZONS FOR THE COCO

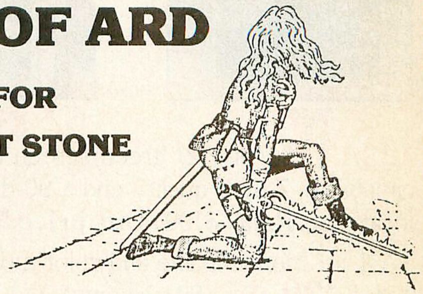
4 TECHS

4-TECHS
P.O. BOX 2575
MERRIFIELD, VA
22116-2575

Check or money orders, American funds only. For orders up to 5 add $2.50 postage and handling, Canada $4 P/H. 4-6 wks. delivery

THE POWER STONES OF ARD

THE QUEST FOR THE SPIRIT STONE



RAINBOW CERTIFICATION SEAL

You're tired, you're hungry, not to mention you're badly injured. No one in town seems to want to talk to you. Your magic sword has stopped glowing, the room is dark, you're out of spells, you can't get your wand to work, you won't swear to it but you may be lost, you have no idea what that last puzzle meant, and you hear something large moving just beyond the only door. The old sage warned you there would be days like this!

"QUEST FOR THE SPIRIT STONE" is an Adventure that will keep you playing for hours. It features single keystroke commands, 16 color graphics, 100% Hi-Res graphics screens, full game save, extensive playing area, level advancement, and the disk is not copy-protected. You choose your character's name, race, sex, and ability scores. The use of arrow keys simplify movement. This one is easy to play but a challenge to complete!

"Fun and challenging . . . should find its way into many CoCo 3 software collections." ***8/88 RAINBOW review***

ONLY $18.00 AND WE PAY SHIPPING!

COLOR COMPUTER 3 AND ONE DISK DRIVE REQUIRED
North Carolina residents add 5% sales tax

Send check or money order to:

THREE C's PROJECTS
P.O. Box 1323,
Hamlet, NC 28345

or call:
(919) 582-5121

HOWARD MEDICAL COMPUTERS

1690 N. Elston • Chicago, IL 60622 • ORDERS (800) 443-1444 • INQUIRIES AND ORDER STATUS (312) 278-1440

★ 5 STAR FINAL | OCTOBER '88 | CLEAR

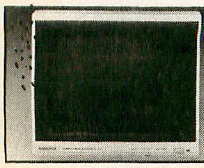
HMC CUTS 515 to $269

Hundreds of $ off Monitors sighted as Major Factor. HMC is reported to have made a special purchase on Magnavox monitors. These items, listed, are being offered at remarkable savings.

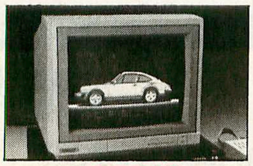
MAGNAVOX 7622 12" Amber Screen offers 900 dots × 350 lines resolution at 20 MHz on a dark glass anti-glare CRT with built-in audio and 1 year warranty. ($7 shipping) **$88** 7652 green screen also available $88

MAGNAVOX 8 CM 515 has analog RGB for CoCo 3, TTL RGB for Tandy 1000 or IBM PC's, and composite color for CoCo 2 and 3. Built-in speaker. 14" screen with 640 dot × 240 line resolution. Plus 2 years parts and labor warranty. reg. list $499 **was $298** **$269** + $14 Shipping

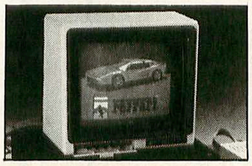
CC-3 Magnavox RGB cable only $19.95 with Magnavox Monitor order. $29.95 w/o monitor.



7622



8CM515

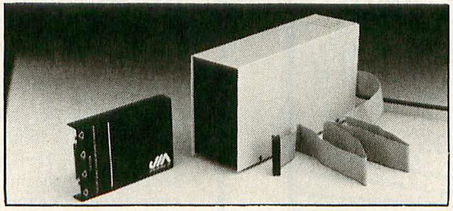


123A

123A 12" This 12" green screen high resolution monitor offers 80 column capability, Zenith quality and a 90-day warranty valid at any of Zenith's 1200 locations. Retail $199. **Our price $67.50** ($7 shipping) REPACK

VA-1 for monochrome and color monitors delivers video interface for CoCo's 1 & 2 **$29.45** ($2 shipping)

DRIVE Ø +. *Howards Drive Ø* gives you a DD-3 MPI drive, a CA-1 cable and a HDS DC-5 Disk Controller for only **$178.45.** Double sided double density 360K. ($5 shipping)
Add $24 for a Disto DC-3



HMC's Guarantee— A Promise you can take to the Bank.

Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back (less shipping.) Shipping charges are for 48 states. APO, Canada and Puerto Rico orders are higher.

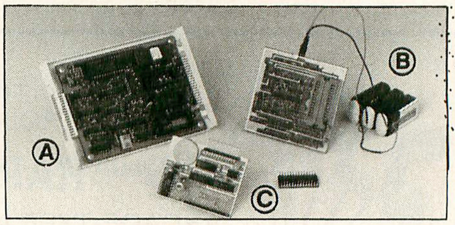
Buyout on DISTO Disk Controllers

Includes controller and C-DOS 4.0 ROM Chip. **DISTO $98** DC-3 [A] ($2 shipping on all DISTO products)

ADD-ON BOARDS

DC-3P Mini Eprom programmer includes all software to program 2764 or 27128 chips [B] **$55**

DC-3C Clock Calendar and parallel printer port [C] **$40**



RS-232 **$49.95** ($2 ship)

Replaces R.S. RS-232 board. Plugs in drive port or multi pack. 2 MHz operation works with OS-9.

MEB **$30** ($2 ship)

Plugs into multi pak to expand DISTO DC-3 bus. Use clock in DC-3 and eprom programmer in MEB.

hotline number

DON'T MISS OUT,
DON'T MISS OUT, ORDER TODAY!

800 / 443-1444

WE ACCEPT VISA • MASTERCARD • AMERICAN EXPRESS • C.O.D. OR CHECKS • SCHOOL P.O.
NEW — DISCOVER CARD

Use our 800 number!

For credit card orders, you may want to phone in your subscription. Our *credit card order* number is (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries please call (502) 228-4492.
We accept VISA, MasterCard and American Express.
Subscriptions to **THE RAINBOW** are $31 a year in the United States. Canadian rate is $38 (U.S. funds only). Surface rate elsewhere is $68 (U.S.). Airmail is $103 (U.S.). All subscriptions begin with the current issue. Please allow 6 to 8 weeks for the first copy. Kentucky residents add 5% sales tax.
In order to hold down non-editorial costs, we do not bill.

Our 800 number is also good for ordering RAINBOW ON TAPE or RAINBOW ON DISK!

Just call (800) 847-0309 anytime from 8 a.m. to 5 p.m. EST. *Credit card orders only.* Subscriptions to **RAINBOW ON TAPE** are $80 a year in the United States, $90 (U.S. funds) in Canada and $105 (U.S.) in all other countries.
RAINBOW ON DISK is $99 a year in the United States, $115 (U.S.) in Canada and $130 (U.S.) in all other countries.
Individual issues of **RAINBOW ON TAPE** are $10 in the U.S., $12 (U.S.) in Canada and all other countries. Individual issues of **RAINBOW ON DISK** are $12 in the U.S., $14 (U.S.) in Canada, and $16 (U.S.) in all other countries. Kentucky residents please add 5% sales tax.
RAINBOW ON TAPE and **RAINBOW ON DISK** are not stand-alone products; you need the magazine for loading and operating instructions and the necessary documentation. **THE RAINBOW** magazine is a separate purchase.

Send Me Rainbow Magazine!

Here's your chance to have a Pot O' Gold full of programs, articles and information about CoCo every month of the year!

As the premier magazine for the Tandy Color Computer, **THE RAINBOW** has more of everything — and greater variety, too. Do yourself and your CoCo a favor and subscribe to **THE RAINBOW** today!

YES! Sign me up for a year (12 issues) of **THE RAINBOW.**

☐ *NEW* ☐ *RENEW (attach label)*

Name ______

Address ______

City ______ *State* ______ *ZIP* ______

☐ Payment Enclosed (payment must accompany order)

Charge: ☐ VISA ☐ MasterCard ☐ American Express

Account Number ______

Signature ______ Card Expiration Date ______

Give Your Fingers A Break!

YES! Sign me up: ☐ *NEW* ☐ *RENEW (attach label)*

☐ *RAINBOW ON TAPE* ☐ *RAINBOW ON DISK (Available beginning with the October 1986 issue)*

☐ *A Full Year* ☐ *Single Issue (specify month & year)* ______

Name ______

Address ______

City ______ State ______ ZIP ______

☐ Payment Enclosed (payment must accompany order)

Charge: ☐ VISA ☐ MasterCard ☐ American Express

Account Number ______

Signature ______ Card Expiration Date ______

The Biggest
The Best
The Indispensable

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

THE RAINBOW is the biggest, best, brightest and most comprehensive publication a happy CoCo ever had! **THE RAINBOW** features more programs, more information and more in-depth treatment of the Tandy Color Computer than any other source.

A monthly issue contains nearly 200 pages and up to two dozen programs, 14 regular columns and as many as 12 new product reviews. And advertisements: **THE RAINBOW** is known as *the* medium for advertisers — which means every month it has a wealth of information unavailable anywhere else about new products! Hundreds of programs are advertised in its pages each month.

Every single issue of **THE RAINBOW** covers the wide spectrum of interests in the Tandy Color Computer — from beginners' tutorials and arcade games to telecommunications and business and finance programs. Helpful utilities and do-it-yourself hardware projects make it easy and fun to expand your CoCo's capabilities. And, monthly reviews by independent reader reviewers take the guesswork out of buying new software and hardware products.

Join the tens of thousands who have found **THE RAINBOW** to be an absolute necessity for their CoCo. With all this going for it, is it surprising that more than 90 percent of **THE RAINBOW** subscribers renew their subscriptions? We're willing to bet that, a year from now, you'll be doing the same.

Rainbow On Tape
& Rainbow On Disk!

— great ways to bring **THE RAINBOW** into your life. Each month, all you do is pop the tape into your cassette player or the disk into your drive. No more lost weekends. As soon as you read an article about a program in **THE RAINBOW**, it's ready to load and run. No work. No wait.

Just think how your software library will grow. With your first year's subscription, you'll get almost 250 new programs: games, utilities, business programs, home applications. And, with **RAINBOW ON DISK**, you'll also get all the OS-9 programs.

RAINBOW ON TAPE and **RAINBOW ON DISK** — they're the "meat" of **THE RAINBOW** at a price that's "small potatoes." And now you even have a choice about how it should be served up to you.

To get your first heaping helping, just fill out and return the attached reply card. No postage necessary.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY

POSTAGE WILL BE PAID BY ADDRESSEE

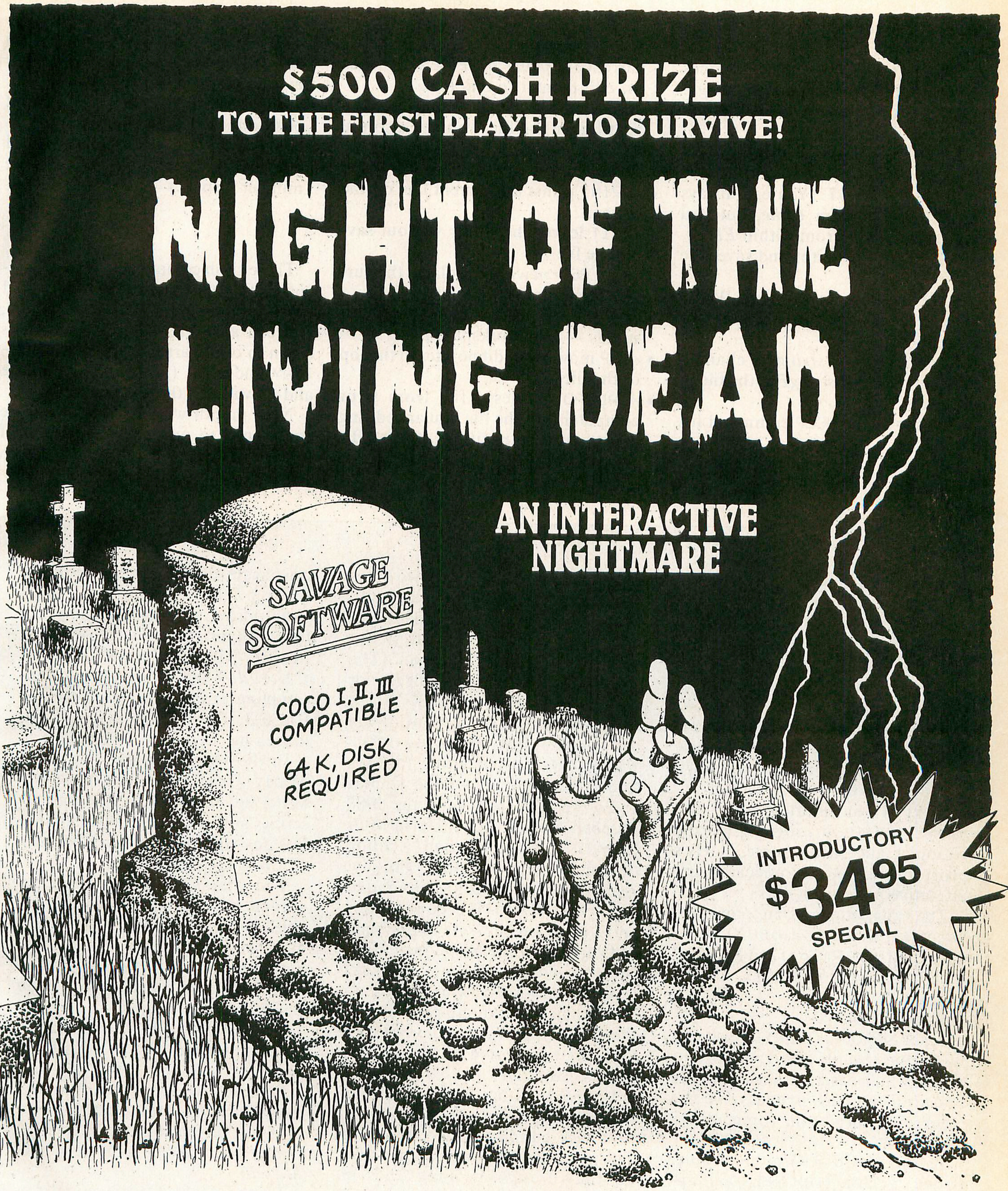
The RAINBOW®
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059-9989

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY

POSTAGE WILL BE PAID BY ADDRESSEE

The RAINBOW®
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059-9989


$500 CASH PRIZE
TO THE FIRST PLAYER TO SURVIVE!
NIGHT OF THE LIVING DEAD
AN INTERACTIVE NIGHTMARE
SAVAGE SOFTWARE
COCO I, II, III COMPATIBLE
64 K, DISK REQUIRED
INTRODUCTORY
$34.95
SPECIAL

ADVENTURE NOVEL SOFTWARE

P.O. BOX 8176, SPARTANBURG, SC 29305

ADVENTURE NOVEL™ INTERACTIVE BOOKS

24 hr. order HOTLINE
(803) 578-7421
C.O.D. ADD $5

MasterCard

VISA

RAINBOW
CERTIFICATION
SEAL

- `/BOTTOM` moves the edit pointer to the bottom of the file.
- `/CHANGE/`*string1*`/`*string2*`/` replaces *string1* in the current line with *string2*.
- `/DELETE` removes the current line from the file.
- `/DIRECTORY` shows a directory of Workspace files.
- `/EDT` invokes *EDT.* (You can always move to *EDT* from *Oldie*, but you cannot call *Oldie* from within *EDT.*)
- `/EXIT` leaves the editor and saves the file.
- `/FETCH` merges an existing Workspace file into the file you are now editing.
- `/GLOBAL/`*string1*`/`*string2*`/` changes all occurrences of *string1* in the file to *string2*.
- `/HELP` shows the `HELP` command list onscreen.
- `/INVISIBLE` toggles the line number display on and off.
- `/LOCATE/`*string*`/` finds the next occurrence of *string* in the file and moves the edit pointer to that line.
- `/NEXT` moves the edit pointer to the next line in the file. You can also use `/+` to move one line forward and `/-` to move one line backward.
- `/PRINT` prints the current line on the screen.
- `/QUIT` leaves the editor without saving the file.
- `/REPLACE/`*newline*`/` replaces the current line of text with *newline*.
- `/SAVE` saves the current file — as it stands — as a Workspace file.
- `/TOP` moves the edit pointer to the top of the file.
- `/UPLOAD` merges a file from your computer into the file you are editing at the current position of the edit pointer. Uses buffer capture (^R/^T flow control).
- `/VIEW` toggles display of the text on and off. It affects display of text while using `/NEXT`.
- `/WHERE` is used to find the current position of the edit pointer. (Especially useful for those who have used `/INVISIBLE` to turn off the line number display.)

These slash commands can be abbreviated *if* enough characters are supplied for the command to be unique. In fact, you can abbreviate all the commands down to one character except `/DIRECTORY` and `/EDT` (`/D` defaults to delete and `/E` will exit the editor).

Next month we'll learn to use these commands to make online editing of text files a breeze.

Hrach (WAROCK) posted *RiBBS-Trek*, a rework of the public domain *Star Trek* game for use on *RiBBS* systems. Jim Hollier (PGJIM) sent us *JTerm* Version 2.9, an upgraded version of the popular *JimmyTerm* program. Bob Ayella (BOBAYELLA) uploaded *BBTerm*, a freeware terminal program. Finally, Paul Pollock (PAULBELL) posted a set of accessory programs for use with *XCom9*.

Barry Aaron (BARRYAARON) uploaded a BASIC09 program for the Graphics and Music topic. Barry's program generates complicated and attractive patterns of dots.

The Programmers Den topic gives us Mike Stute (GRIDBUG), who uploaded the `Printf` and `Scanf` functions for the standard C library.

CoCo SIG

Jerry Semones (JERRYS) posted a humorous text file called *And It Was Good*, which describes the corporate decision-making process, in the General Information topic of the database.

In the CoCo 3 Graphics topic, Bruce Nelson (DOCNELSON) uploaded his picture of the galaxy. Mark Garbarini (F19) uploaded four original drawings that he created with *The Rat*, and I (DONHUTCHISON) posted the CoCo Gallery files for three previous months. John Barrett (JBARRETT) sent us two of his *CoCo Max 3* pictures. Eric Robichaud (EGROBICHAUD) uploaded an updated version of his `MGE` viewer utility for MS-DOS machines. (The MS-DOS programs, *PKXARC* or *ARC* are required to unARC these files. *TC*, as used on the CoCo, will *not* work.) Bob Wharton (BOBWHARTON) posted some fantasy drawings, a picture of the Qantas koala, an NFL logo, and the 1988 Baseball All-Stars logo. David Mills (DAVIDMILLS) uploaded a nude drawn by Brad Bansner. Finally, Zack Sessions (ZACKS) uploaded some `PMODE4-to-MGE` conversions and a program he wrote to do them.

The Source for 6809 Assemblers topic includes Roger Krupski (HARDWAREHACK), who posted an 80-column screen dump program for the CoCo 3, and Jason Forbes (COCO3KID), who posted the source code for his game *Life*.

In the Utilities & Applications topic, Robert Pierce (RPIERCE) sent us a disk editor package, and Eric Tilenius (TILENIUS) uploaded a utility that breaks the long lines in ASCII files (created by many word processors) into files containing lines of a specified length. (This utility inserts carriage returns as needed to ensure that line length.) Malcolm Heath (MACHEATH) uploaded his no-hassle check register for the CoCo 3. While Ken Halter (KENHALTER) posted a program that prints four disk directories in a row, Craig Moore (CRAIGMOORE) posted *CMAudio*, a freeware sound-sampling program designed for the CoCo 3. Troy House (AMTEX) uploaded his *TV Guide Companion*.

In the Hardware Hacking topic, Marty Goodman (MARTYGOODMAN) uploaded a text file that describes how to modify a standard Hi-Res joystick adapter for use with *CoCo Max 3*.

The Classic Graphics topic included my posting of the CoCo Gallery files for twelve previous months, Jason Forbes' *Life* tutorial graphics and some graphics simulations for the game and some of John Barrett's favorite cute faces.

Dick White (DICKWHITE) posted six archived poll results files in the Archives topic.

Product Reviews & Announcements included Mike Stute's review of *Lyra* Version 2.52, and Spencer Lepley's (SPENCELEPLEY) review of *Max-10*.

In the Data Communications topic, Malcolm Heath posted a version of the *WeFax* program for the DMP-105/106 printer.

That does it for this month. See you online on Delphi!

OWL-WARE

Proven Technology

New CoCo 3 Utilities

Great for 512K Systems! From Color Venture and OWL-WARE

PRINTER LIGHTNING

A great print spooler which gives you 44K print buffer from a 128K CoCo and up to 438K (200 pages!) from a 512K CoCo. With this spooler you can run a program while you are printing a file. The spooler does not slow down the computer to any noticeable extent while you are running a second program and no lost characters arise. Baud rates selectable. *Printer Lightning* can reside in memory along with *RAMDISK*!

RAMDISK

Using 512K CoCo 3 you have access to 2 additional disk drives in RAM. All disk commands are supported, and the data are Reset button protected. You can now have up to 5 disk drive capacities on line at once and can assign the ram disks to any drive number. By making the ramdisk Drive 0, all programs which require a lot of drive access will run much faster. You can have the *RAMDISK* in memory at the same time as the *Printer Lightning*!

BACKUP LIGHTNING

This program is the fastest way to make backup copies of your files using a 512K CoCo. You can backup 35, 40, or 80 track disks single or double sided. Both RS and OS-9 disks may be backed up. The original disk is saved to memory and a copy can be made on an ***unformatted disk*** every 45 seconds! The lightning read, write, format, and verify routines that were developed make this program much quicker that RSDOS or OS-9 for backups. This will become one of your most used programs!

·NEW·NEW· **Only $19.95 each. 3 for $39.95.**

SPECIAL With our 512K Upgrade (Next page) only $2. each or 3 for $5!

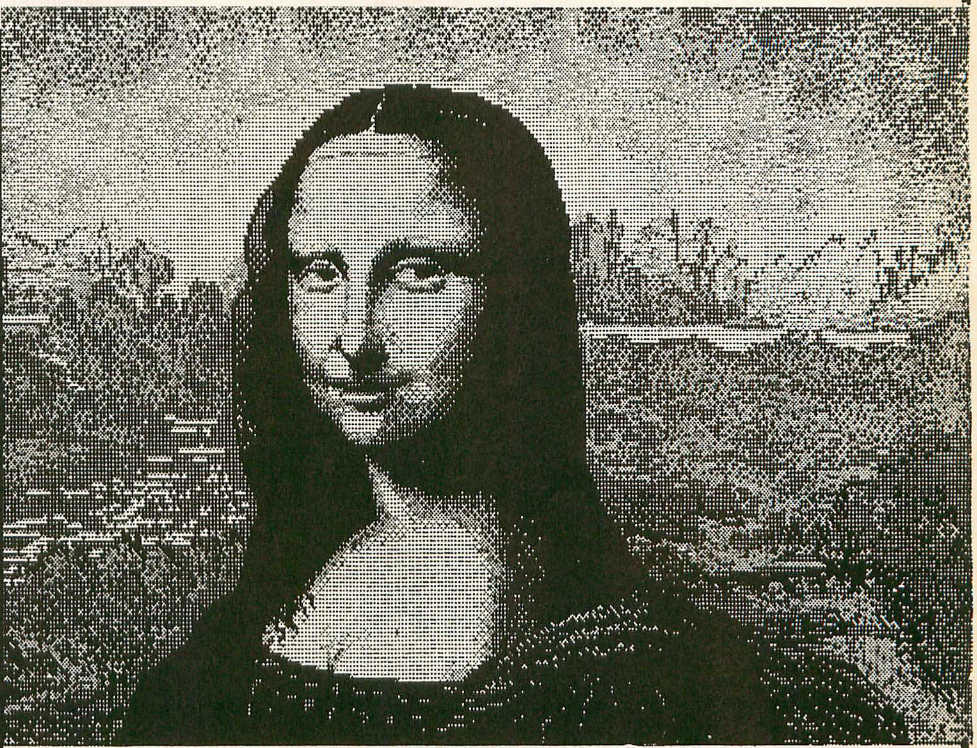
Announcing:

The finest graphics/drawing program for the COCO 3!

Da Vinci 3

- 16 colors on screen at one time
- Modify each color from 64 available colors
- Use composite or RGB monitor
- Draw with custom paintbrushes
- Full resolution 320 X 192
- Picture converter for conversion of COCO 2 pictures to COCO 3
- Multiple text fonts
- Accepts input from joystick, X-pad, mouse, or touch-pad
- Boxes, circles, line, paint generation
- Screen dump for Tandy mono and color ink-jet printers, (NX-10 and others pending)
- Sensible price
- No additional hardware required because of course/fine joystick movement modes
- Zoom mode for individual pixel editing
- Great on screen menu which is removable at the touch of a key to allow full screen edit

128K or 512K COCO 3 **$37.95**



Super I/O Board for OS-9

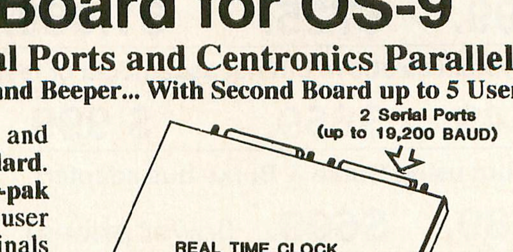
Each Board Provides 2 Serial Ports and Centronics Parallel Port

First Board has Real Time Clock and Beeper... With Second Board up to 5 Users

The serial ports are usable **up to 19,200 Baud**, and the parallel port is a **true Centronics standard**. Plug into your multi-pak. **On CoCo 3, multi-pak must be upgraded.** You will have a multi-user system with additional computers or terminals plugged into the serial ports. An OWL hard drive and 512K upgrade are strongly recommended for multi-user systems.

Intro Price... **$169.**

BOARD 2... $145.



More Ads...

OWL-WARE

P.O. Box 116-A
Mertztown, PA 19539
— ORDER LINES (only) —
(800) 245-6228
(215) 682-6855 (PA)

OWL-WARE

Proven

On the Razor's Edge of

Basic and OS-9 Hard Drive Systems

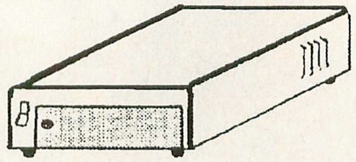
Proven Performance for Demanding Home or Business Users

Every hard drive which has been produced by OWL-WARE during the last 3 years is **complete**. A system consists of software, hard drive, controller, heavy-duty power supply, and LR Tech Interface. There are no hidden costs for assembly or testing. When a drive system is ordered, we fully **assemble**, **test**, and **burn-in** the system for 3 full days. This ensures dependability and optimum performance.

We have now been supplying CoCo hard drive systems and parts for more than 3 years. This is the longest history in the CoCo market of any system. Some other advertisers are stating that they have one of the most reliable systems for the CoCo *with all of 4 months history in the CoCo hard drive market*! We have reached our position in the hard drive market by providing our customers with a quality product that they (and we) can be proud to own and use.

Because of many requests for a lower price system in kit form, we are now selling a kit of all parts at a significant discount compared to our regular prices. We recommend this kit (or any kits offered by any other supplier) only to those who have experience in electronic assembly and OS-9.

For OS-9 Levels 1 and 2



	10 Meg.	20 Meg.	40 Meg.	80 Meg. (2 X 40 Meg.)
System Prices: (Includes Hard Drive, Controller, LR Tech Interface, Software. Fully assembled and tested.)	$469.	$599.	$725.	$1,069.
Kit Prices: (LR Tech System as above but not assembled or tested.)	$419.	$549.	$659.	$ 999.
Kit Prices: (As above but using Burke & Burke bus adapter)	(na)	$489.	$609.	(lower prices)

30 Meg Kit: $539. (Lowest prices anywhere)

OWL Hard Drive BASIC 3

There have been several ads in this magazine about BASIC for Color Computer hard drive systems. These ads sometimes only tell a part of the story. Our BASIC system price includes **assembly**, **testing**, and **3-day burn-in** period. We do not require a Multi-pak to operate.

Our hard drive systems are fast, reliable, and reasonable in price. This has been proven by hundreds of users over the past 3 years. We do not have to turn off error checking for speed. We achieve high speed BASIC from a unique indexing method.

The table below will summarize some of the key points about our BASIC hard drive system and two other systems. We believe that we have the best BASIC interface for CoCo hard drives available.

BASIC Hard Drive Systems*

Feature	OWL	B&B	RGB
Drive Portion Available	Entire	Entire(?)	Entire
User Sets BASIC/OS-9 Partitions	YES	Yes	No
Add to Existing OS-9 Drive Without Reformat	YES	Yes(?)	No
Drives 0-3 Hard/Floppy	YES	No	Yes
Built in Park	YES	No	Yes
Speed*	FAST	Fast	Fast

*All feature details are believed to be true at time of writing and are subject to change. We believe that our BASIC hard drives are the fastest due to our indexing method, but all three systems are fast. On ours all BASIC commands work including DSKINI, DSKI$, and DSKO$.

Prices: With/Without Hard Drive

$35./$79.

Technology

the Color Computer Frontier

DISK DRIVES

Bonus!
Special
Bundled
Software
with any
Disk Drive
Purchase!

Floppy Drive Systems

The Highest Quality for Service Now and for Years to Come

Use our WHISPER DRIVE for the finest, quietist drive

Drive 0 Systems (Half Height, Double Sided, Direct Drives) **$219.**

Drive 0 systems complete with drive, controller, legal DOS, cable, case, power supply, and manual

Drive 1 Systems (Half Height, Double Sided, Direct Drives) **$129.**

New 3.5", 720K Drives for OS-9 with case & Power Supply **$179.**

Drive 1 Systems have drive, case, power supply. (You may require optional cable and/or DOS chip to use)

Special for 0/1 Combos (Drives 0,1,2,3) $315.

HALF- HEIGHT DRIVE UPGRADES FOR RS HORIZONTAL CASES

Why only double the capacity of your system when you can triple in the same case? Kit includes: double-sided to fit your case, chip to run both sides of new drive, hardware, and detailed instructions. Easy! Takes only 5 minutes!

Model 500	Model 501 or 502
$119.	$129.

All drives are new and fully assembled. We ship only FULLY TESTED and CERTIFIED at these low prices. We use Fuji, YE Data, and other fine brands. No drives are used or surplus unless otherwise stated to you when you order. We appear to be the one of the few advertisers in Rainbow who can truly make this claim. We have 5 years experience in the CoCo disk drive market! We are able to provide support when you have a problem.

Drives 1 Year Warranty

OWL Phones

Order Numbers (only)
1-800-245-6228
1-215-682-6855

Technical Help
1-215-837-1917

OWL WARE Software Bundle

Disk Tutorial/Utilities/Games

DISK TUTOR Ver 1.1

Learn how to use your disk drive from this multi-lesson, machine language program. This tutor takes you through your lessons and corrects your mistakes for a quick, painless disk drive introduction. (This professionally written tutor is easily worth the bundle's total price.)

OWL DOS

An operating system that gives faster disk access and allows the use of double-sided drives. Corrects a floating point number error on early CoCo systems.

COPY-IT

Quickly copies selected programs between disks. A wild card option selects groups of programs to copy.

VERIFY

Verifies reading of each sector. Bad sectors are listed on the screen.

2 GAMES

We will select 2 games from our stock. These sold for more than $20 each.

If sold separately this is more than $125 worth of software!!

Do not mistake this software with cheap, non-professional "Public Domain" software which is being offered by others. All of this software is copyrighted and professional in quality. The tutor is unique with us and has helped thousands of new users learn their disk drive.

only $27.95
(or even better)
only $6.95 with any Disk Drive Purchase!!

Our prices include a discount for cash but do not include shipping.

OWL-WARE has a liberal warranty policy. During the warranty period, all defective items will be repaired or replaced at our option at no cost to the buyer except for shipping costs. Call our tech number for return. Return of non-defective or unauthorized returns are subject to a service charge.

OWL-WARE
P.O. BOX 116
Mertztown, PA 19539

A program to make your keyboard perform like the big boys — and more

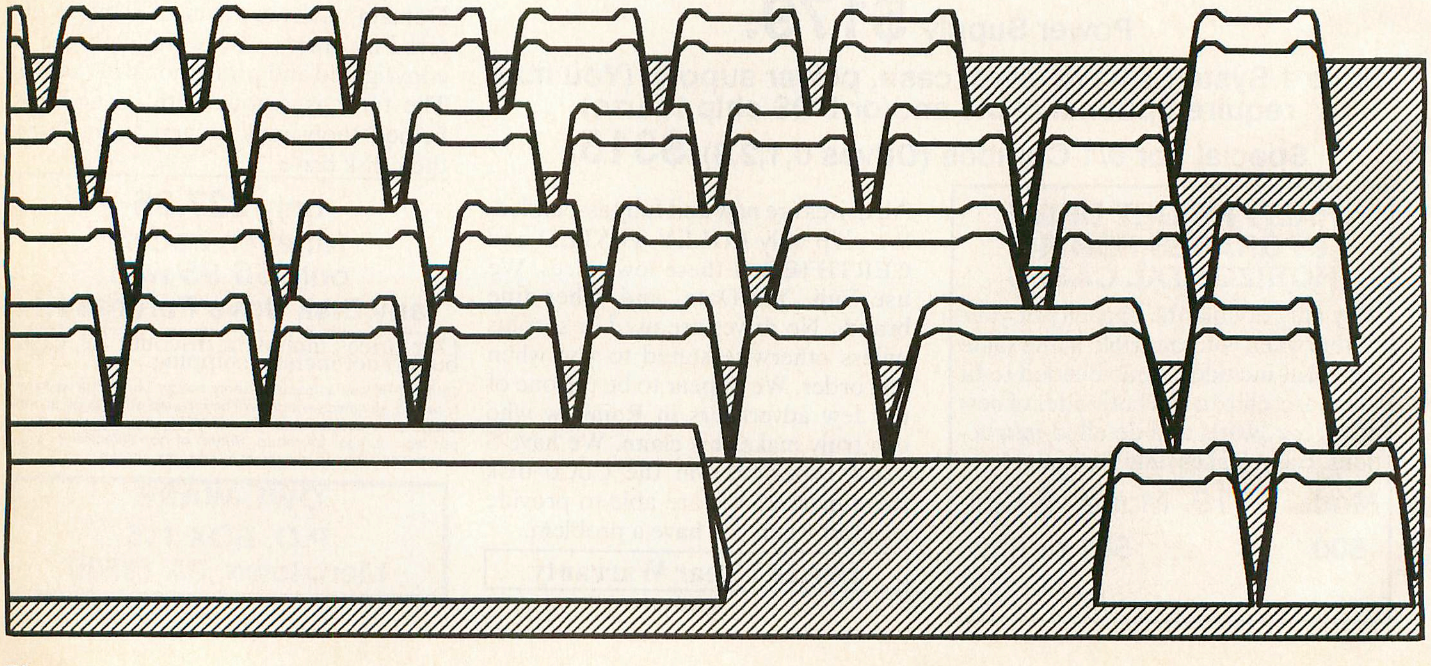
Get More Power From Your CoCo Keyboard

By Michael Sweet

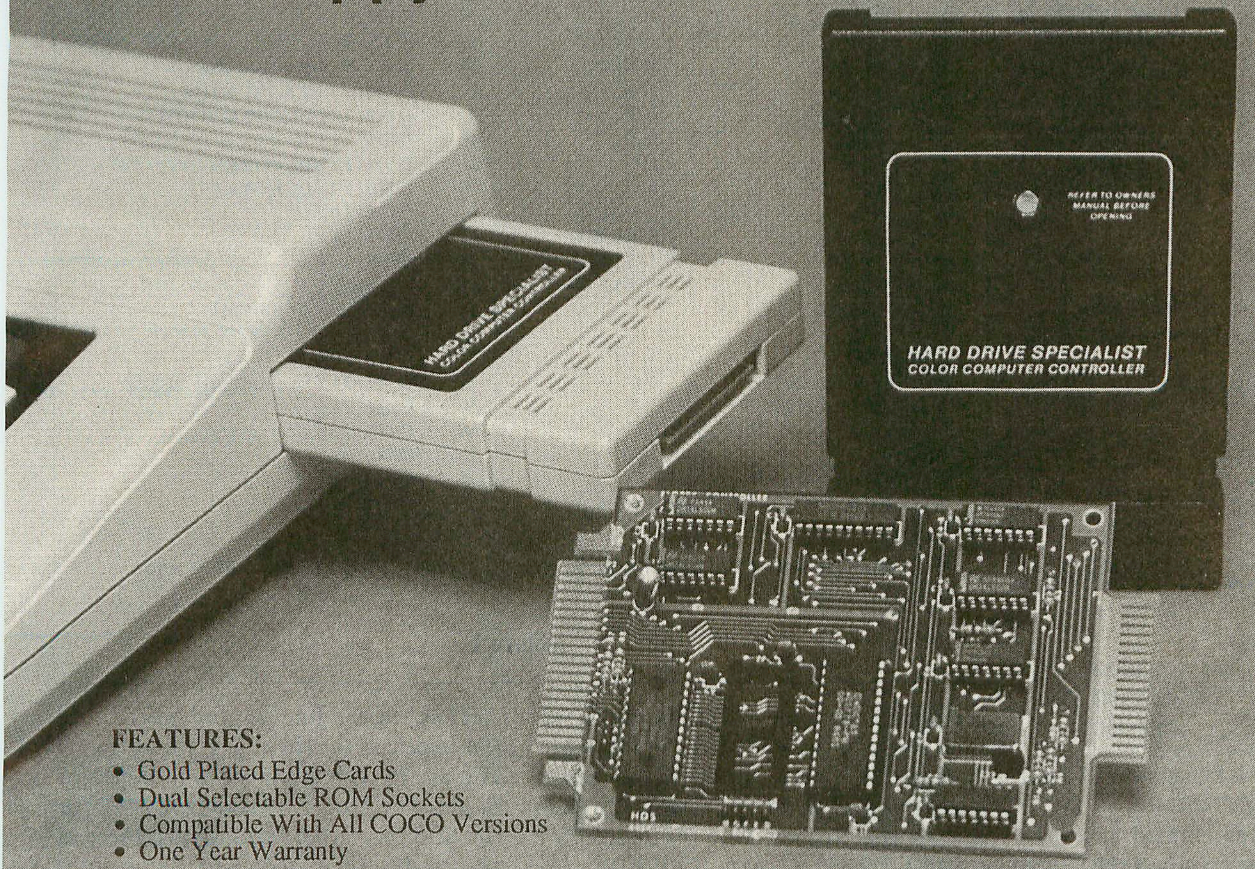
Every month more and more hardware and software seems to come out for the CoCo, and the first thing most CoCo owners get is a new keyboard. Most available keyboards contain four extra keys, either four function keys or two function keys and the ALT and CTRL keys. The program presented in this article will patch BASIC so the extra keys will perform functions similar to those of the PC Compatibles. Also added are a print spooler (32K buffer for 64K machines), an added device number for owners of the Radio Shack Sound-Speech Pak, and a screen print (dump to printer) routine for both

---

Mike Sweet is a student at Cayugo County Community College. He has won awards for programming in the New York state math symposium and hopes to make programming his career.



New Low Prices! New Products!
HDS Floppy Drive Controller Board


REFER TO OWNERS MANUAL BEFORE OPENING
HARD DRIVE SPECIALIST
COLOR COMPUTER CONTROLLER
HDS

FEATURES:

- Gold Plated Edge Cards
- Dual Selectable ROM Sockets
- Compatible With All COCO Versions
- One Year Warranty

HARD DRIVE SPECIALIST has manufactured floppy drive controllers for the Color Computer for SIX years. Buy the controller alone to upgrade your present drive system, or purchase a complete drive 0 to get a high quality drive system loaded with features. This controller allows the use of either two 24 pin ROMS, or one 24 pin and one 28 pin ROM. Using this board with the standard Radio Shack ROM gives you 100% compatibility with all Radio Shack software.

Completed and Tested Board with ROM (includes Case and DOS instructions)	**$99.**
Completed and Tested Board without ROM (includes case)	**$79.**
Bare Board with Instruction Manual.	**$30.**
Parts Kit for Bare Board without ROM	**$30.**
Radio Shack ROM (current version)	**$30.**
Double Sided Compatible ROM	**$20.**
NEW! **Magnavox 8CM515 Monitor** with Cable for COCO 3	**$289.**
NEW! **2400 BAUD ZOOM External Modem** with Cable.	**$179.**

NEW!

	5.25 inch	3.5 inch
Drive 0 Complete.	**$169.**	**$185.**
Drive 1 Complete	**$119.**	**$134.**
Drive 0&1 Dual Drive Complete	**$259.**	**$289.**
Bare Drive	**$85.**	**$100.**

Drive Kits are complete with half height double sided drives mounted in a case with power supply. Drive 0 kits also include cable and controller with ROM. 3.5 inch drives yield 720K when used with appropriate DOS (ADOS, 0S9, etc.)

Ordering Information: Use our WATS line to place your order via VISA, MasterCard, or Wire Transfer. Or mail your payment directly to us. Any non-certified funds will be held until proper clearance is made. COD orders are welcome as well as purchase orders from government agencies. Shipping costs are available upon request. If you are not satisfied with your purchase within 30 days, you may return product for full refund excluding shipping costs.

ORDER TODAY!!

HARD DRIVE SPECIALIST
16208 Hickory Knoll ■ Houston, Texas ■ 77059
1-713-480-6000 ■ 1-800-231-6671 EXT 437

the text screen and any graphics screens.

The standard CoCo keyboard contains 54 keys, with the SHIFT keys tied to the same input so that the computer "sees" only 53 keys. Radio Shack did not allow for the four extra keys, so the normal key scan will not return correct codes for these keys. To utilize the extra keys, you will need an assembler (*EDTASM+* or similar). As listed, the program will work on a 32K CoCo or a CoCo 3. It can be altered to work with 16K and 64K machines as follows:

For 64K systems, make the following changes:

```
100      ORG      $7800
1690     CMPX     #$FF00
2100     CMPX     #$FF00
```

and add the following lines:

```
1660     STA      $FFDF
1680     STA      $FFDE
2070     STA      $FFDF
2090     STA      $FFDE
```

For 16K systems make the following changes:

```
100      ORG      $3000
1690     CMPX     #$4000
2100     CMPX     #$4000
```

Please note that the 64K version will *not* work properly on a CoCo 3.

Once you have assembled the program to tape or disk, go into BASIC, type `CLEAR 200,&H6FFF` for 64K or `CLEAR 200,&H27FF` for 16K and load the program. Execute the program, remembering that you must never type `EXEC` more than once after you have loaded it — doing so will destroy all the old I/O routine pointers. If you have typed the program in correctly, all the keys should function normally. Holding them down should yield auto-repeat. The extra keys should work as shown in Figure 1.

The program initializes itself at `START` by redirecting BASIC's I/O routines (screen output, keyboard input and printer output). Note that the `INKEY$` function address is changed to point to a new routine (lines 340 through 430) so that it will check the keyboard buffer. The between-statements routine is also redirected for the same reason (lines 440 through 450). BASIC also checks to see if you have specified a legal device number (as in a `PRINT#-1` statement) and reports an FC error if you haven't. In order to allow a device number of -3 for the Speech Pak, this also had to be changed (lines 460 through 470). The next 550 lines contain the code for the interrupt routine (`NEWIRQ`, for keyboard entry checking and print spooling); the output to the Speech Pak (`SPEECH`); for output to the screen (`CHROUT`); for spooler use (both `PRINTR` for entry of print data into the buffer and `SERIRQ` for spooler output to the printer); and the keyboard scan routine itself (`POLKEY`, `POLCAT`, `NEW16A`, `GETKEY` and `NEW19A`).

Now the screen print program (`SCRKEY`) is encountered. Since `SCRKEY` is called from `POLKEY`, the stack has to be reset in order for it to return correctly. Then Location $FF22 is read. If it is >127 (negative), then the program goes to `GRAPH`. Otherwise the text screen is assumed to be seen, and text from $400 to $5FF is converted to ASCII format and sent to the printer. If it is a graphics screen, the starting address of the screen is assumed to be in Address $BA (BASIC's screen pointer).

A page code, `CHR$(12)`, is sent to the printer, along with a half forward linefeed code. On most Tandy printers this is a `CHR$(27)` plus `CHR$(28)` combination; if yours is different, change lines 6480 and 6500 to LDA numbers, putting the codes after the number signs.

Then the old line length is saved, and the width is set for the graphics mode you are in. If it is one of the four-color modes, the program moves to `COLOR` for the dump. Otherwise, it produces a reversed screen image to the printer (white dots appear black). This can be changed by de-commenting (removing the asterisks) in lines 6930 and 7440.

Once the dump is done, the program restores the old line length and full linefeed. The codes used by Tandy are `CHR$(27)` and `CHR$(54)`. If your printer uses different codes, change lines 7050 and 7070 the same way you did before.

In order to produce a large image, I decided to use the block graphics characters available on Tandy printers (lines 7660 through 7730). If your printer does not use the same codes (two codes per line, in Hex), replace them with codes corresponding to the low-resolution graphics characters (see *Getting Started With Color BASIC*). If your printer does not support these characters, the screen print routine will work only for the text mode. One possible solution is to add a graphics dump routine.

A note to Tandy printer owners: Look in your printer manual for details on the block graphics characters. Some print modes (Correspondence, etc.) do not allow graphics.

*** ALT + letter or number = Command**

@	PRINT @	S	SIN(
A	ATN(	T	TAN(
B	BACKUP	U	USING
C	COS(	V	VERIFY
D	DATA	W	WRITE
E	EDIT	X	PEEK
F	FILES	Y	POKE
G	GOTO	Z	PPOINT(
H	HEX$(	0	RND(0)
I	INPUT	1	#-1,
J	JOYSTK(	2	#-2,
K	KILL	3	#-3,
L	LINE	4	&H
M	MEM	5	&O
N	NEW	6	CHR$(
O	OPEN	7	STRING$(
P	PRINT	8	INSTR(
Q	PSET	9	MID$(
R	PRESET		

Unshifted

* F1 RUN and ENTER
* F2 LIST and ENTER

Shifted

* F1 SCREEN 0 and ENTER
* F2 POKE 111,254:DIR and ENTER

*** CTRL + letter = Command**

@	screen print (dump to printer)
A	CHR$(1)
B	CHR$(2)
C	CHR$(3) or BREAK
D	CHR$(4)
E	CHR$(5)
F	CHR$(6)
G	CHR$(7)
H	CHR$(8) or left arrow
I	CHR$(9) or right arrow
J	CHR$(10) or down arrow
K	CHR$(11)
L	CHR$(12) or CLEAR
M	CHR$(13) or ENTER
N	CHR$(14)
O	CHR$(15)
P	CHR$(16)
Q	CHR$(17)
R	CHR$(18) or SHIFT-0
S	CHR$(19)
T	CHR$(20)
U	CHR$(21) or SHIFT-left arrow
V	CHR$(22)
W	CHR$(23)
X	CHR$(24)
Y	CHR$(25)
Z	CHR$(26)

* Keyboards with four function keys: Use F1 for ALT, F2 for CTRL, and F3 and F4 for F1 and F2.

Figure 1

Details of the I/O Routines

Several changes were made to the printer routine, the first one being the addition of a print spooler. Memory locations &H9B and &H9C contain the carriage width (number of characters per line) and the current printer head position. When the end of a line is reached, a carriage return, `CHR$(13)`, is sent. Also, locations &H97 and &H98 are the current page line number and the maximum page line number. When the current page line number is equal to the maximum, a form feed, `CHR$(12)`, is sent. This way you won't print over the perforations in the printer paper. The page length (in Line 320) and the line length (second two digits of Line 290) can be from 01 to FF Hex (1 to 255 decimal) and can be changed without affecting the program's function. Also, the baud rate is set to 29 Hex (1200 baud) and can be changed for printers that handle faster baud rates. Replace the first two digits in Line 290 with the Hex value for the baud rate you want.

The Speech Pak output routine (lines 1470 through 1610) merely does what Radio Shack's program on Page 11 of the CoCo manual does, but now all you have to do is type:

```
PRINT #-3,"HELLO"
```

and you will hear the computer say "hello." One interesting side effect of this is that Extended BASIC uses Device #-3 for input from a modem. That could make writing terminal software considerably easier! The `SPEECH` routine itself keeps scanning Address &HFF7E until Bit 7 is set (ready to receive signal — >127). Then it sends a

The listing: `KEYPOWER`

```
7000                00100          ORG     $7000
7000 BE   010D      00110 START    LDX     $10D
7003 BF   70B6      00120          STX     1+NEWRTI
7006 8E   70AF      00130          LDX     #NEWIRQ
7009 BF   010D      00140          STX     $10D
700C B6   010C      00150          LDA     $10C
700F B7   70B5      00160          STA     NEWRTI
7012 BE   0168      00170          LDX     $168
7015 BF   70CC      00180          STX     1+NEW67
7018 8E   70B8      00190          LDX     #NEW167
701B BF   0168      00200          STX     $168
701E B6   0167      00210          LDA     $167
7021 B7   70CB      00220          STA     NEW67
7024 BE   016B      00230          LDX     $16B
7027 BF   758B      00240          STX     1+NEW6A
702A 8E   7586      00250          LDX     #NEW16A
702D BF   016B      00260          STX     $16B
7030 B6   016A      00270          LDA     $16A
7033 B7   758A      00280          STA     NEW6A
7036 CC   2950      00290          LDD     #$2950
7039 97   96        00300          STA     <$96
703B D7   9B        00310          STB     <$9B
703D CC   0040      00320          LDD     #$40
7040 DD   97        00330          STD     <$97
7042 BE   0128      00340          LDX     $128    GET FUNCTION CALL ADDRESS LOCATION
7045 86   14        00350          LDA     #$14    # OF ADDRESSES
7047 108E 7087      00360          LDY     #NEW128 NEW TABLE LOCATION
704B 10BF 0128      00370          STY     $128
704F EE   81        00380 S1       LDU     ,X++
7051 EF   A1        00390          STU     ,Y++
7053 4A             00400          DECA
7054 26   F9        00410          BNE     S1
7056 CE   75D3      00420          LDU     #INKEY
7059 EF   3C        00430          STU     -4,Y
705B 8E   75E6      00440          LDX     #NEW19A BETWEEN STATEMENTS BREAK CHECK
```

As EASY As WRITING A CHECK

THAT'S HOW EASY IT IS TO:

- RECONCILE YOUR CHECK BOOK
- USE A BUDGET
- KEEP TRACK OF CASH EXPENSES
- TRACK CHECK, ATM & CASH EXPENSES BY TYPE OR PAYEE
- SUMMARIZE YOUR EXPENSES FOR TAX TIME - OR FOR ANY OTHER PURPOSE

RAINBOW CERTIFICATION SEAL

GREAT DOCUMENTATION
ON SCREEN MENU'S & PROMPTS
DEFINATELY USER FRIENDLY
REQUIRES 32K CoCo 1, 2, or 3 AND SINGLE DISK DRIVE
REVIEWED IN DECEMBER' 87 RAINBOW

RAINBOW CERTIFICATION SEAL

THE CoCo CHECKBOOK -
$25.00 + $2.50 shipping and handling

PROGRAMS for PEOPLE
from
BOB'S SOFTWARE
P.O. Box 391 Cleveland, Ohio
44107-0391

VIP DISK-ZAP

VIP Disk-ZAP

RAVED ABOUT IN THE
APRIL 1983 "RAINBOW"

Now you can retrieve lost data on any disk. VIP Disk-Zap is the ultimate repair utility for repair of most disk errors. VIP Disk-Zap verifies diskettes, reads and writes any sector and lets you retrieve all types of bashed text files, BASIC and ML programs. VIP Disk-Zap includes a 50 page tutorial manual DISK $24.95

VIP Terminal

RATED BEST IN JANUARY
1984 "RAINBOW"

For your important communications needs you've got to go beyond software that only lets you chat. You need a smart terminal so that you can send and receive programs and messages and print them! The VIP Terminal features 32, 51, 64 or 85 characters by 21 or 24 lines on the screen and has a 43K byte buffer to store information. DISK $29.95

VIP TERMINAL

Turn the page for more VIP software!

character to the Speech Pak and returns.

The spooler routine is standard issue. After putting the character into a circular buffer, it updates the line position and page line values as necessary. The actual printing is done during an IRQ interrupt, where the routine checks to see if the printer is busy or not. If not, it will, if possible, pull a character out of the buffer and send it to the printer.

POLKEY is quite similar to BASIC's keyscan routine at $A1C1, but the addition of the four keys and their functions required some overhauling. First, the SHIFT key is not masked from the rollover any longer, although pressing it alone will not return a code. The same holds true for the ALT and CTRL keys. For this reason, holding down one of these keys for more than a second and then pressing another key with it gives an instant repeat of that key.

Following the POLKEY routine is the POLCAT routine, which is called during the IRQ interrupt. First it calls POLKEY to see if a key has been pressed. If not, it returns. If the code returned is negative, the corresponding eight-character string is put into the keyboard type-ahead buffer. Otherwise, the code returned is put into the buffer. The buffer will hold up to 128 characters. If the buffer is full, the speaker will beep a warning to you.

At Line 4170 the ALT keys are defined, starting with ALT-@. Each definition may be up to eight characters long, and the ASCII code of the last character must be 128 or greater for the program to recognize the end of its definition. Also, each definition must start on an even eight-byte boundary from ALTCHR. Thus, RMBs are used to fill up the rest of the unused bytes between definitions.

The function key definitions come at Line 5270 and may be up to 16 characters long. Therefore, they must come at even 16-byte boundaries to each other, again using RMBs.

NEW16A is called during the input routine and at the OK prompt. If the keyboard is being called for input, the routine will wait, with the cursor flashing, until the buffer has some characters in it. Once a key has been pressed, the cursor is erased and the buffer is updated, moving the buffer contents down one character. Then the keystroke is returned to the input routine.

NEW19A is the between-statements BREAK and SHIFT-@ check. The keyboard buffer is checked to see if a keypress has been made. If so, NEW19A checks to see if it was BREAK or SHIFT-@. If it was neither, it continues with the Extended BASIC routine at $82C0 (for TRON tracing). If BREAK was pressed, the screen is restored to text and the spooler buffer is reset. The BASIC routine waits until another key is pressed, and then goes to the Extended BASIC between-statements routine.

Conclusion

Once you get this program up and running, you'll probably wonder how you got along without the use of your function keys. I also own a Tandy 1000, and it was the basis for my new keyboard driver. I must say, though, that even though that computer is supposed to run five times faster than the CoCo, it lacks the ease and friendliness of the CoCo.

(Questions or comments concerning this program may be directed to the author at 206 E. Main St., Elbridge, NY 13060. Please enclose an SASE when requesting a reply.) ☐

```
705E BF   019B      00450        STX     $19B
7061 8E   7079      00460        LDX     #NEW161
7064 BF   0162      00470        STX     $162
7067 86   7E        00480        LDA     #$7E
7069 B7   0167      00490        STA     $167
706C B7   016A      00500        STA     $16A
706F B7   010C      00510        STA     $10C
7072 B7   019A      00520        STA     $19A
7075 B7   0161      00530        STA     $161
7078 39             00540        RTS
7079 32   62        00550 NEW161 LEAS    2,S
707B C1   FD        00560        CMPB    #$FD
707D 2D   05        00570        BLT     DNERR
707F C1   0F        00580        CMPB    #15
7081 2E   01        00590        BGT     DNERR
7083 39             00600        RTS
7084 7E   A61F      00610 DNERR  JMP     $A61F
7087                00620 NEW128 RMB     40
70AF BD   734B      00630 NEWIRQ JSR     POLCAT
70B2 BD   71DF      00640        JSR     SERIRQ
70B5 7E   8000      00650 NEWRTI JMP     $8000
70B8 34   04        00660 NEW167 PSHS    B
70BA D6   6F        00670        LDB     <$6F
70BC 27   45        00680        BEQ     CHROUT
70BE C1   FD        00690        CMPB    #$FD
70C0 1027 00A4      00700        LBEQ    SPEECH
70C4 5C             00710        INCB
70C5 35   04        00720        PULS    B
70C7 102B 00C2      00730        LBMI    PRINTR
70CB 7E   8000      00740 NEW67  JMP     $8000
70CE 8C   0600      00750 SCR    CMPX    #$600
70D1 25   2E        00760        BLO     CONT1
70D3 8E   0400      00770        LDX     #$400
70D6 EC   88 20     00780 SCROLL LDD     32,X
70D9 ED   81        00790        STD     ,X++
70DB EC   88 20     00800        LDD     32,X
70DE ED   81        00810        STD     ,X++
70E0 EC   88 20     00820        LDD     32,X
70E3 ED   81        00830        STD     ,X++
70E5 EC   88 20     00840        LDD     32,X
70E8 ED   81        00850        STD     ,X++
70EA 8C   05E0      00860        CMPX    #$5E0
70ED 25   E7        00870        BLO     SCROLL
70EF 9F   88        00880        STX     <$88
70F1 CC   6060      00890        LDD     #$6060
70F4 ED   81        00900 SCLOOP STD     ,X++
70F6 ED   81        00910        STD     ,X++
70F8 ED   81        00920        STD     ,X++
70FA ED   81        00930        STD     ,X++
70FC 8C   0600      00940        CMPX    #$600
70FF 25   F3        00950        BLO     SCLOOP
7101 35   96        00960 CONT1  PULS    A,B,X,PC
7103 AF   61        00970 CHROUT STX     1,S
7105 34   02        00980        PSHS    A
7107 9E   88        00990        LDX     <$88
7109 81   20        01000        CMPA    #$20
710B 25   15        01010        BLO     CTRLCH
710D 4D             01020        TSTA
710E 2B   0A        01030        BMI     CONT2
7110 81   60        01040        CMPA    #$60
7112 24   04        01050        BHS     *+6
7114 8A   40        01060        ORA     #$40
7116 20   02        01070        BRA     CONT2
7118 80   60        01080        SUBA    #$60
711A A7   80        01090 CONT2  STA     ,X+
711C 9F   88        01100        STX     <$88
711E 20   AE        01110        BRA     SCR
7120 35   96        01120 CRTS   PULS    A,B,X,PC
7122 81   08        01130 CTRLCH CMPA    #8
7124 26   0F        01140        BNE     CONT3
7126 9E   88        01150        LDX     <$88
7128 8C   0400      01160        CMPX    #$400
712B 27   F3        01170        BEQ     CRTS
712D 86   60        01180        LDA     #$60
712F A7   82        01190        STA     ,-X
7131 9F   88        01200        STX     <$88
7133 35   96        01210        PULS    A,B,X,PC
7135 81   0D        01220 CONT3  CMPA    #$0D
7137 26   14        01230        BNE     C5
7139 86   60        01240        LDA     #$60
713B D6   89        01250        LDB     <$89
713D C4   1F        01260        ANDB    #$1F
713F 50             01270        NEGB
7140 CB   20        01280        ADDB    #$20
7142 9E   88        01290        LDX     <$88
7144 A7   80        01300 CONT4  STA     ,X+
7146 5A             01310        DECB
7147 26   FB        01320        BNE     CONT4
7149 9F   88        01330        STX     <$88
714B 20   81        01340        BRA     SCR
714D 81   0C        01350 C5     CMPA    #$0C
714F 26   CF        01360        BNE     CRTS
7151 8E   0400      01370        LDX     #$400
7154 CC   6060      01380        LDD     #$6060
7157 9F   88        01390        STX     <$88
7159 ED   81        01400 C6     STD     ,X++
715B ED    81         01410          STD     ,X++
715D ED    81         01420          STD     ,X++
715F ED    81         01430          STD     ,X++
7161 8C    0600       01440          CMPX    #$600
7164 25    F3         01450          BLO     C6
7166 35    96         01460          PULS    A,B,X,PC
7168 35    04         01470 SPEECH   PULS    B
716A 32    62         01480          LEAS    2,S
716C 7D    FF7E       01490 SPWAIT   TST     $FF7E
716F 2A    FB         01500          BPL     SPWAIT
7171 B7    FF7E       01510          STA     $FF7E
7174 34    02         01520          PSHS    A
7176 B6    FF01       01530          LDA     $FF01
7179 84    F7         01540          ANDA    #$F7
717B B7    FF01       01550          STA     $FF01
717E B6    FF03       01560          LDA     $FF03
7181 8A    08         01570          ORA     #8
7183 B7    FF03       01580          STA     $FF03
7186 86    3C         01590          LDA     #60
7188 B7    FF23       01600          STA     $FF23
718B 35    82         01610          PULS    A,PC
718D AF    E4         01620 PRINTR   STX     ,S
718F 34    03         01630 SPOOL    PSHS    CC,A
7191 BE    71DA       01640          LDX     SPPOS
7194 1A    50         01650          ORCC    #$50
7196 A7    80         01670          STA     ,X+
7198 8C    8000       01690          CMPX    #$8000
719B 25    03         01700          BLO     SPRTS
719D 8E    7774       01710          LDX     #BUFSTR
71A0 BF    71DA       01720 SPRTS    STX     SPPOS
71A3 BC    71DC       01730 WAITSP   CMPX    SPSTRT
71A6 27    FB         01740          BEQ     WAITSP
71A8 81    0D         01750 UPDATE   CMPA    #$0D
71AA 26    12         01760          BNE     UP1
71AC 0F    9C         01770          CLR     <$9C
71AE 0C    97         01780          INC     <$97
71B0 96    97         01790          LDA     <$97
71B2 91    98         01800          CMPA    <$98
71B4 25    06         01810          BLO     UPRTS
71B6 86    0C         01820          LDA     #$0C
71B8 AD    9F A002    01830          JSR     [$A002]
71BC 35    93         01840 UPRTS    PULS    A,X,CC,PC
71BE 81    0C         01850 UP1      CMPA    #$0C
71C0 26    06         01860          BNE     UP2
```

```
71C2 0F    9C         01870          CLR     <$9C
71C4 0F    97         01880          CLR     <$97
71C6 35    93         01890          PULS    A,X,CC,PC
71C8 0C    9C         01900 UP2      INC     <$9C
71CA 96    9C         01910          LDA     <$9C
71CC 91    9B         01920          CMPA    <$9B
71CE 25    EC         01930          BLO     UPRTS
71D0 0F    9C         01940          CLR     <$9C
71D2 86    0D         01950          LDA     #$0D
71D4 AD    9F A002    01960          JSR     [$A002]
71D8 35    93         01970          PULS    A,X,CC,PC
71DA       7774       01980 SPPOS    FDB     BUFSTR
71DC       7774       01990 SPSTRT   FDB     BUFSTR
71DE 39               02000 SERRTI   RTS
71DF B6    FF22       02010 SERIRQ   LDA     $FF22
71E2 44               02020          LSRA
71E3 25    F9         02030          BCS     SERRTI
71E5 BE    71DC       02040          LDX     SPSTRT
71E8 BC    71DA       02050          CMPX    SPPOS
71EB 27    F1         02060          BEQ     SERRTI
71ED A6    80         02080          LDA     ,X+
71EF 8C    8000       02100          CMPX    #$8000
71F2 25    03         02110          BLO     SERPRT
71F4 8E    7774       02120          LDX     #BUFSTR
71F7 BF    71DC       02130 SERPRT   STX     SPSTRT
71FA 8D    13         02140 SERIAL   BSR     STOPBT
71FC 5F               02150          CLRB
71FD 8D    12         02160          BSR     SENDBT
71FF C6    08         02170          LDB     #8
7201 34    04         02180          PSHS    B
7203 5F               02190 SLOOP    CLRB
7204 44               02200          LSRA
7205 59               02210          ROLB
7206 58               02220          ASLB
7207 8D    08         02230          BSR     SENDBT
7209 6A    E4         02240          DEC     ,S
720B 26    F6         02250          BNE     SLOOP
720D 32    61         02260          LEAS    1,S
720F C6    02         02270 STOPBT   LDB     #2
7211 F7    FF20       02280 SENDBT   STB     $FF20
7214 9E    95         02290          LDX     <$95
7216 34    10         02300          PSHS    X
7218 BD    7346       02310          JSR     DELAY
721B 35    10         02320          PULS    X
```

MJK & MJK3
DOS

RAINBOW CERTIFICATION SEAL

WHY BUY ADOS 3
WHEN YOU CAN HAVE THIS

New: MJK-DOS for COCO 1, 2, and 3 $39.95

Most powerfull operating system for the CoCo ever! Allows up to 3 DS-80 track drives or standard drives. The DS-80 drives are software configurable to standard Radio Shack* format in order to maintain compatibility. Allows global file name specification with wildcards. All the files will be displayed alphabetically, including the date that the file was saved. Use one command to KILL or COPY a number of files that meet the global filename specification (can be a full disk!) in one run or one at a time upon user prompt (Y-key). Use the powerfull CHAIN command to use programs of any length. Use the built in FULL SCREEN EDITOR to allow fast and easy program modification. You can even use the TRON command that will put you (after an error) in the modified line editor or get the automatic error trap routine with fully spelled out error names. Hit one key to repeat the last command. You will also get error trap, repeat key, AUTO, DATE, CAT (two columns of directory with only the filenames & extensions), WAIT, RUNM, BAUD, FIND, OLD, DATE$, (string in basic program), LCOPY (groups of basic lines), REPL (to replace a string), TYPE (list a text file on screen/printer), SPLIT or JOIN basic lines, SAY for real spoken text, word peek & poke and many more.... MJK-DOS is primarily intended for double-sided 80-track drives (720K each)

ALLOWS YOU TO READ/WRITE/FORMAT 35/40 DISKS ON A 80T DRIVE
********* EPROMABLE ****** **** FREE UPDATES FOR 1 YEAR ****

MJK512 DOS(COCO3-512K) $49.95
BUILT IN RAM DISK AND RAM TEST COMMANDS
Monitor-Disassembler (COCO 1, 2&,3) $39.95
Source-Code Generator/LabelGenerator (COCO1,2&,3) $49.95
JB REMOTE rs-232 pack driver for bbs etc. (COCO1,2,&3) $19.95
NEWKEY (COCO3) new key scan--gives you true ALT & CTRL $15.00
NEWKEY232(COCO3)--JB REMOTE and NEWKEY in one package $25.00
RTC -real time hardware clock for the coco 1,2,&3 $35.00

CALL OR WRITE (COD ORDERS OK)
COCO CONNECTION OF PHILA, PA.
5003 B ST.
PHILA., PA. 19120
PHONE: 215-457-1809 VOICE AND DATA
COMPUSERIVE ID: 72317.437(LEAVE PHONE#)

VIP Calc

VIP CALC

"MORE USEABLE FEATURES"
FEBRUARY 1985 "RAINBOW"

Now every CoCo owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some. VIP Calc displays 32, 51, 64 or 85 characters by 21 or 24 lines right on the screen. VIP Calc allows up to a 33K worksheet with up to 512 columns by 1024 rows! In addition, VIP calc has multiple windows which allow you to compare and contrast results of changes. Other features include 16 DIGIT PRECISION • trig. functions • averaging • algebraic functions • column and row ascending or descending SORTS • locate formulas or titles in cells • block move and replicate • global or local column width • limitless programmable functions • works with any printer, Embed printer control codes for customized printing. Combine spreadsheet tables with VIP Writer documents to create ledgers, projections, statistical and financial budgets and reports. Requires 64K. DISK $59.95

VIP Speller

VIP SPELLER

INCLUDES 50,000 WORD DICTIONARY

VIP Speller works with ANY ASCII file created by most popular word processors. It automatically checks text files for words to be corrected, marked for special attention or even added to the 50,000 word Dictionary. You can even view the word in context. Words can be added to or deleted from the dictionary or you can create your own dictionary! DISK $34.95

Turn the page for more VIP software!

```
721D 16   0126     02330        LBRA   DELAY
7220 32   7B       02340 POLKEY LEAS   -5,S     SET ASIDE STACK SPACE
7222 6F   63       02350        CLR    3,S      NO KEY HELD DOWN
7224 7A   7345     02360        DEC    TIMER    TIME HELD-1
7227 26   05       02370        BNE    POLL1    IF NOT HELD LONG ENOUGH FOR REPEAT
7229 86   03       02380        LDA    #$3      REPEAT DELAY
722B BD   7318     02390        JSR    RESET    RESET ROLLOVER TABLE FOR RECOGNITION
722E 8E   0152     02400 POLL1  LDX    #$152    ROLLOVER TABLE
7231 4F            02410        CLRA
7232 4A            02420        DECA            A=-1
7233 A7   E4       02430        STA    ,S       SCAN #
7235 A7   62       02440        STA    2,S      ROW MASK
7237 A6   62       02450 POLL2  LDA    2,S      ROW MASK
7239 49            02460        ROLA            NEXT ROW
723A 1024 00AF     02470        LBHS   PDONE    IF NO KEY PRESSED
723E A7   62       02480        STA    2,S      SAVE NEW ROW MASK
7240 6C   E4       02490        INC    ,S       NEXT SCAN ROW
7242 BD   7303     02500        JSR    SCAN     GET THIS ROW'S KEY PRESSES
7245 A7   61       02510        STA    1,S      SAVE BIT MASK
7247 A8   84       02520        EORA   ,X
7249 A4   84       02530        ANDA   ,X       NO REPEAT(UNLESS TABLE RESET)
724B E6   61       02540        LDB    1,S
724D E7   80       02550        STB    ,X+      NEW POLL VALUE
724F 5C            02560        INCB            +1
7250 27   E5       02570        BEQ    POLL2    IF NO BITS OFF(KEY PRESS)
7252 6C   63       02580        INC    3,S      KEY PRESSED
7254 4D            02590        TSTA
7255 27   E0       02600        BEQ    POLL2    IF ITS A KEY THAT IS BEING HELD DOWN, IGNOR
E IT
7257 C6   F8       02610        LDB    #$F8     -8
7259 CB   08       02620 POLL3  ADDB   #$08     +8
725B 44            02630        LSRA
725C 24   FB       02640        BHS    POLL3    LOOP UNTIL ROW*8 IS COMPUTED
725E 8E   7343     02650        LDX    #DELAY-3       POINT TO @ SIGN
7261 EB   E4       02660        ADDB   ,S       ADD TO COL FOR SCAN CODE
7263 27   30       02670        BEQ    EXCEPT   IF @ SIGN KEY, IT'S AN EXCEPTION
7265 C1   1A       02680        CMPB   #$1A
7267 2F   1E       02690        BLE    LETTER   IF A-Z
7269 8E   72F1     02700        LDX    #TSTART-$36
726C C1   20       02710        CMPB   #$20
726E 2F   25       02720        BLE    EXCEPT   IF ARROW KEYS OR SPACE BAR
7270 8E   72D3     02730        LDX    #TSTART-$54
7273 C1   30       02740        CMPB   #$30
7275 2C   1E       02750        BGE    EXCEPT   IF ENTER OR OTHER KEY
7277 BD   730C     02760        JSR    SHIFT    ELSE ITS CHR$(33)-CHR$(63),DO SHIFT CHECK
727A C1   2B       02770        CMPB   #$2B
727C 2F   02       02780        BLE    *+4
727E 88   40       02790        EORA   #$40
```

TANDY COMPUTER DISCOUNTS

COLOR COMPUTERS

26-3334 CoCo 3	165.00
26-3215 CM-8 color monitor	259.95

PRINTERS

26-2802 DMP 106	179.95
26-2808 DMP 440	599.00
26-1280 DMP-130	279.00

Complete line of Tandy (Daisy Wheel) print wheels

MSDOS COMPUTERS

25-1053 TANDY 1000 HX	599.00
25-1600 TANDY 1000 TX	999.95
25-4071 TANDY 3000 HL	1,300.00
25-1023 CM-5 color monitor	249.95
25-1020 VM-4 Monochrome monitor	110.00

We Carry the Complete Line of Tandy Computer Products at Discount Prices

CALL FOR A FREE PRICE LIST 800-257-5556
IN N.J. CALL 609-769-0551

WOODSTOWN ELECTRONICS
Rt. 40 E. WOODSTOWN, N.J. 08098

CINSOFT
PROGRAMS • PERIPHERALS • SUPPLIES • SERVICE

Fast Delivery...
Friendly Service

Now in our 6th year!

Avatex Modems

* NEW LOW PRICES *

Avatex 1200e	$ 89
with Coco Cable	99
Avatex 2400	$199
with Coco Cable (Coco 3 only)	209
with RS-232 Cable*	225

Reviewed in this month's Rainbow!

Avatex 1200e, Cable AUTOTERM ... $129

RAINBOW CERTIFICATION SEAL

Avatex 2400, Cable AUTOTERM ... $239

*Coco 1, 2 requires Deluxe RS-232 Pak

• Call •
513-396-SOFT

• Shop by Modem •
513-396-SHOP

VISA MasterCard AMERICAN EXPRESS

2235 Losantiville, Cincinnati, OH 45237
SHIPPING will be charged at our ACTUAL COST
Ohio residents add 5.5% Sales Tax COD add 2.50

```
7280 4D              02800          TSTA
7281 26    1A        02810          BNE     FINAL1
7283 CB    10        02820          ADDB    #$10
7285 20    16        02830          BRA     FINAL1
7287 CA    40        02840 LETTER   ORB     #$40
7289 BD    730C      02850          JSR     SHIFT
728C BA    011A      02860          ORA     $11A
728F 26    0C        02870          BNE     FINAL1
7291 CA    20        02880          ORB     #$20    SHIFTED LETTER
7293 20    38        02890          BRA     FINAL3
7295 58              02900 EXCEPT   ASLB            2 CODES/KEY
7296 8D    74        02910          BSR     SHIFT   SHIFT KEY CHECK
7298 27    01        02920          BEQ     *+3     IF NOT PRESSED
729A 5C              02930          INCB
729B E6    85        02940          LDB     B,X     CHARACTER CODE RETURNED
729D C1    60        02950 FINAL1   CMPB    #$60
729F 24    2C        02960          BHS     FINAL3  IF A LOWERCASE LETTER, NO ALT CODE FOR IT
72A1 C1    30        02970          CMPB    #$30
72A3 25    28        02980          BLO     FINAL3  IF LOWER THAN A #, NO CODE FOR IT EITHER
72A5 C1    40        02990          CMPB    #$40
72A7 25    0A        03000          BLO     ALT2    IF ITS A #, GET ITS CODE
72A9 86    F7        03010 ALT1     LDA     #$F7    ELSE DO
72AB 8D    61        03020          BSR     SHIFT+2 AN ALT CHECK
72AD 27    12        03030          BEQ     FINAL2  IF NOT PRESSED
72AF CB    40        03040          ADDB    #$40
72B1 20    1A        03050          BRA     FINAL3  RETURN AN ALT CODE
72B3 C1    39        03060 ALT2     CMPB    #$39    > #
72B5 22    16        03070          BHI     FINAL3  YES
72B7 86    F7        03080          LDA     #$F7    ELSE DO AN
72B9 8D    53        03090          BSR     SHIFT+2 ALT CHECK
72BB 27    10        03100          BEQ     FINAL3  IF NOT PRESSED
72BD CB    6B        03110          ADDB    #$6B    ELSE RETURN AN ALT CODE
72BF 20    0C        03120          BRA     FINAL3
72C1 86    EF        03130 FINAL2   LDA     #$EF    DO A CTRL CHECK
72C3 8D    49        03140          BSR     SHIFT+2
72C5 27    06        03150          BEQ     FINAL3  IF NOT PRESSED
72C7 C0    40        03160          SUBB    #$40    ELSE RETURNED IS 64 LESS
72C9 1027  0369      03170          LBEQ    SCRKEY  IF CTRL-@, DO A SCREEN DUMP
72CD E7    64        03180 FINAL3   STB     4,S     SAVE ASCII CHARACTER
72CF 8E    045E      03190          LDX     #$45E
72D2 BD    7346      03200          JSR     DELAY
72D5 86    FF        03210          LDA     #$FF    NO ROW MASK
72D7 8D    2A        03220          BSR     SCAN
72D9 4C              03230          INCA
72DA 26    11        03240          BNE     PDONE   IF KEY STILL BEING PRESSED
72DC A6    62        03250          LDA     2,S     ELSE MAYBE SCAN WAS A MISTAKE
72DE 8D    23        03260          BSR     SCAN
72E0 A1    61        03270          CMPA    1,S
```

Armchair Admiral

"Avast ye swabbies!" Roars Captain Blackbeard. "Hoist the Jolly Roger! When I gives the word, give 'em a broadside!" As Blackbeard's flotilla closes upon it's prey, a lookout suddenly cries, "Captain, a British Man-of-War!"

……

The time-honored parlor game of Battleship, enhanced by intelligent computer opponents, comes to your Coco3 complete with sloops and galleons. Up to eight opponents, any mix of human or computer. Available for the Coco3 with 80 column display and one disk drive. $14.95 + $2 S&H. WA residents please add 7.6% sales tax.

Order from: Eversoft
P.O. Box 3354
Arlington, Wa 98223-3354

RAINBOW CERTIFICATION SEAL

Personal check, money orders, and COD orders welcome.
GEnie mailbox: EVERSOFT

VIP Writer

VIP WRITER

RATED "BEST" IN SEPT '88 "RAINBOW"

VIP Writer has all the features of VIP Writer III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green and white, double clock speed is not supported, Spooler is unavailable. Hard disk is not supported. Even so, VIP Writer is the BEST word processor for the CoCo 1 & 2! VIP Writer includes VIP Speller AT NO ADDITIONAL COST. **DISK $69.95**

VIP Database

VIP DATABASE

"ONE OF THE BEST" JULY 1984 "RAINBOW"

VIP Database has all the features of VIP Database III described elsewhere in this magazine except the screen widths are 51, 64 & 85. Screen colors are black, green and white, double clock speed is not supported, Spooler is unavailable. Even so, VIP Database is the most complete database for the CoCo 1 & 2! **DISK $49.95**

Turn the page for more VIP software!

```
72E2 26   09     03280          BNE    PDONE    NO, IT WAS RIGHT, BUT KEY RELEASED
72E4 C1   12     03290          CMPB   #$12     ELSE MAYBE IT WAS SHIFT-0
72E6 26   17     03300          BNE    PRTS     NO
72E8 73   011A   03310          COM    $11A     ELSE SWITCH BETWEEN UPPER/LOWERCASE
72EB 20   10     03320          BRA    NOKEY    DON'T RETURN A KEY CODE FOR IT
72ED 6D   63     03330 PDONE    TST    3,S
72EF 27   07     03340          BEQ    PD1      IFKEY NOT PRESSED
72F1 B6   7345   03350          LDA    TIMER
72F4 81   5B     03360          CMPA   #$5B
72F6 26   05     03370          BNE    NOKEY
72F8 86   5C     03380 PD1      LDA    #$5C
72FA BD   7318   03390          JSR    RESET
72FD 6F   64     03400 NOKEY    CLR    4,S      NO KEY CODE RETURNED
72FF 32   64     03410 PRTS     LEAS   4,S
7301 35   82     03420          PULS   A,PC
7303 B7   FF02   03430 SCAN     STA    $FF02
7306 B6   FF00   03440          LDA    $FF00
7309 8A   80     03450          ORA    #$80
730B 39          03460          RTS
730C 86   7F     03470 SHIFT    LDA    #$7F
730E B7   FF02   03480          STA    $FF02
7311 B6   FF00   03490          LDA    $FF00
7314 43          03500          COMA
7315 84   40     03510          ANDA   #$40
7317 39          03520          RTS
7318 B7   7345   03530 RESET    STA    TIMER
731B CC   FF08   03540          LDD    #$FF08
731E 8E   0152   03550          LDX    #$152
7321 A7   80     03560 RLOOP    STA    ,X+
7323 5A          03570          DECB
7324 26   FB     03580          BNE    RLOOP
7326 39          03590          RTS
7327      5E5F   03600 TSTART   FDB    $5E5F
7329      0A5B   03610          FDB    $0A5B
732B      0815   03620          FDB    $0815
732D      095D   03630          FDB    $095D
732F      2020   03640          FDB    $2020
7331      3012   03650          FDB    $3012
7333      0D0D   03660          FDB    $0D0D
7335      0C5C   03670          FDB    $0C5C
7337      0303   03680          FDB    $0303
7339      0000   03690          FDB    $0000
733B      0000   03700          FDB    $0000
733D      A5A9   03710          FDB    $A5A9
733F      A7AB   03720          FDB    $A7AB
7341      0000   03730          FDB    $0000
7343      4013   03740          FDB    $4013
7345      5C     03750 TIMER    FCB    $5C
7346 30   1F     03760 DELAY    LEAX   -1,X
7348 26   FC     03770          BNE    DELAY
734A 39          03780          RTS
734B BD   7220   03790 POLCAT   JSR    POLKEY
734E 4D          03800          TSTA
734F 27   0F     03810          BEQ    BEEP-1
7351 2B   31     03820          BMI    FILLBF
7353 F6   739D   03830 PUTBUF   LDB    NUMCHR
7356 2B   09     03840          BMI    BEEP
7358 7C   739D   03850          INC    NUMCHR
735B 8E   739E   03860          LDX    #CHRBUF
735E A7   85     03870          STA    B,X
7360 39          03880          RTS
7361 B6   FF23   03890 BEEP     LDA    $FF23
7364 84   F3     03900          ANDA   #$F3
7366 B7   FF23   03910          STA    $FF23
7369 F6   FF22   03920          LDB    $FF22
736C CA   02     03930          ORB    #$02
736E F7   FF22   03940          STB    $FF22
7371 8A   04     03950          ORA    #$04
7373 B7   FF23   03960          STA    $FF23
7376 86   40     03970          LDA    #$40
7378 F6   FF22   03980          LDB    $FF22
737B C8   02     03990 BLOOP1   EORB   #$02
737D F7   FF22   04000          STB    $FF22
7380 4A          04010          DECA
7381 26   F8     04020          BNE    BLOOP1
7383 39          04030          RTS
7384 C6   08     04040 FILLBF   LDB    #8
7386 80   80     04050          SUBA   #$80
7388 3D          04060          MUL
7389 108E 741E   04070          LDY    #ALTCHR
738D 31   AB     04080          LEAY   D,Y
738F A6   A0     04090 FLOOP1   LDA    ,Y+
7391 2B   05     04100          BMI    FNEXT1
7393 BD   7353   04110          JSR    PUTBUF
7396 20   F7     04120          BRA    FLOOP1
7398 84   7F     04130 FNEXT1   ANDA   #$7F
739A 16   FFB6   04140          LBRA   PUTBUF
739D      00     04150 NUMCHR   FCB    0
739E             04160 CHRBUF   RMB    128
741E      50     04170 ALTCHR   FCC    /PRINT/
          52
          49
          4E
          54
7423      C0     04180          FCB    $C0
7424             04190          RMB    2
7426      41     04200          FCC    /ATN/
          54
          4E
7429      A8     04210          FCB    $A8
742A             04220          RMB    4
```

```
742E      42     04230          FCC    /BACKU/
          41
          43
          4B
          55
7433      D0     04240          FCB    $D0
7434             04250          RMB    2
7436      43     04260          FCC    /COS/
          4F
          53
7439      A8     04270          FCB    $A8
743A             04280          RMB    4
743E      44     04290          FCC    /DAT/
          41
          54
7441      C1     04300          FCB    $C1
7442             04310          RMB    4
7446      45     04320          FCC    /EDI/
          44
          49
7449      D4     04330          FCB    $D4
744A             04340          RMB    4
744E      46     04350          FCC    /FILE/
          49
          4C
          45
7452      D3     04360          FCB    $D3
7453             04370          RMB    3
7456      47     04380          FCC    /GOT/
          4F
          54
7459      CF     04390          FCB    $CF
745A             04400          RMB    4
745E      48     04410          FCC    /HEX$/
          45
          58
          24
7462      A8     04420          FCB    $A8
7463             04430          RMB    3
7466      49     04440          FCC    /INPU/
          4E
          50
          55
746A      D4     04450          FCB    $D4
746B             04460          RMB    3
746E      4A     04470          FCC    /JOYSTK/
          4F
          59
          53
          54
          4B
7474      A8     04480          FCB    $A8
7475             04490          RMB    1
7476      4B     04500          FCC    /KIL/
          49
          4C
7479      CC     04510          FCB    $0CC
747A             04520          RMB    4
747E      4C     04530          FCC    /LINE/
          49
          4E
          45
7482      A8     04540          FCB    $A8
7483             04550          RMB    3
7486      4D     04560          FCC    /ME/
          45
7488      CD     04570          FCB    $0CD
7489             04580          RMB    5
748E      4E     04590          FCC    /NE/
          45
7490      D7     04600          FCB    $D7
7491             04610          RMB    5
7496      4F     04620          FCC    /OPE/
          50
          45
7499      CE     04630          FCB    $CE
749A             04640          RMB    4
749E      50     04650          FCC    /PRIN/
          52
          49
          4E
74A2      D4     04660          FCB    $D4
74A3             04670          RMB    3
74A6      50     04680          FCC    /PSET/
          53
          45
          54
74AA      A8     04690          FCB    $A8
74AB             04700          RMB    3
74AE      50     04710          FCC    /PRESET/
          52
          45
          53
          45
          54
74B4      A8     04720          FCB    $A8
74B5             04730          RMB    1
74B6      53     04740          FCC    /SIN/
          49
          4E
74B9      A8     04750          FCB    $A8
```

```
74BA          04760     RMB     4
74BE    54    04770     FCC     /TAN/
        41
        4E
74C1    A8    04780     FCB     $A8
74C2          04790     RMB     4
74C6    55    04800     FCC     /USIN/
        53
        49
        4E
74CA    C7    04810     FCB     $C7
74CB          04820     RMB     3
74CE    56    04830     FCC     /VERIF/
        45
        52
        49
        46
74D3    D9    04840     FCB     $D9
74D4          04850     RMB     2
74D6    57    04860     FCC     /WRITE/
        52
        49
        54
        45
74DB    A3    04870     FCB     $A3
74DC          04880     RMB     2
74DE    50    04890     FCC     /PEEK/
        45
        45
        4B
74E2    A8    04900     FCB     $A8
74E3          04910     RMB     3
74E6    50    04920     FCC     /POK/
        4F
        4B
74E9    C5    04930     FCB     $C5
74EA          04940     RMB     4
74EE    50    04950     FCC     /PPOINT/
        50
        4F
        49
        4E
        54
74F4    A8    04960     FCB     $A8
74F5          04970     RMB     1
74F6    52    04980     FCC     /RND(0/
        4E
        44
```

```
        28
        30
74FB    A9    04990     FCB     $A9
74FC          05000     RMB     2
74FE    23    05010     FCC     /#-1/
        2D
        31
7501    AC    05020     FCB     $AC
7502          05030     RMB     4
7506    23    05040     FCC     /#-2/
        2D
        32
7509    AC    05050     FCB     $AC
750A          05060     RMB     4
750E    23    05070     FCC     /#-3/
        2D
        33
7511    AC    05080     FCB     $AC
7512          05090     RMB     4
7516    26    05100     FCC     /&/
7517    C8    05110     FCB     $C8
7518          05120     RMB     6
751E    26    05130     FCC     /&/
751F    CF    05140     FCB     $CF
7520          05150     RMB     6
7526    43    05160     FCC     /CHR$/
        48
        52
        24
752A    A8    05170     FCB     $A8
752B          05180     RMB     3
752E    53    05190     FCC     /STRING$/
        54
        52
        49
        4E
        47
        24
7535    A8    05200     FCB     $A8
7536    49    05210     FCC     /INSTR/
        4E
        53
        54
        52
753B    A8    05220     FCB     $A8
753C          05230     RMB     2
753E    4D    05240     FCC     /MID$/
        49
```

★ ★ ★ NEW ★ ★ ★

BASH by Steve Bjork
Based on a popular arcade game which we can't mention (But sounds like "Art Gannoyed"). BASH challenges you to clear the screen by "BASHING" your ball through multiple brick layers. Of course you'll have help getting through this 20 level game by activating options like, Slow Ball, Expanded Paddle, Multi-Ball and more!
Reg $29.95 Introductory Special $24.95
Color Computer 3 only

★ ★ ★ NEW ★ ★ ★

WARP FIGHTER 3-D by Steve Bjork
Blast into Hyper-Drive with this fun-filled starship shoot-em-up! You'll have a captain's eye view out of your 3-D cockpit as you try to rid the galaxy of the evil enemy forces. Game includes 3-D glasses and works on any Color T. V., Composite or RGB monitor.
Reg $29.95 Introductory Special $24.95 EXTRA GLASSES $2.95
Color Computer 3 only

★ ★ ★ NEW ★ ★ ★

MINE RESCUE by Steve Bjork
A terrible mine disaster has just occurred and it will be up to you and your talents to enter the mine, jump the pits, avoid the spikes, fight off the bats and other creepy crawlers and get air to the needy victims. Mine rescue features over 2 megabytes of arcade-style graphics, real time music and multiple mine levels. Hours of fun!
Reg $29.95 Introductory Special $24.95
Color Computer 3 only

★ ★ ★ NEW ★ ★ ★

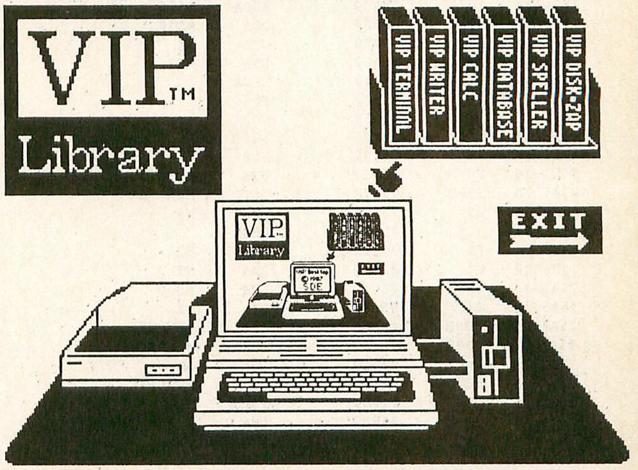
SAMPLE DISK
Tired of getting burned on games you haven't seen? Try our sample disk. We'll ship the above three games on a demo disk for you to see for yourself how good they are. If you decide to purchase the full versions, we will deduct the sample disk price from your order (3-D Glasses Not Included).
Demo Disk $4.95

SUPER SPECIAL GET ALL THREE GAMES FOR $60.00!

ATTENTION PROGRAMMERS – Game Point Software is looking for talented writers. Top royalties guaranteed.

Send Check or Money Order to:
Add $3.00 S/H

GAME POINT SOFTWARE
P. O. BOX 6907
BURBANK, CA 91510-6907



The VIP Integrated Library combines all six popular VIP programs - VIP Writer*, Speller, Calc, Database*, Terminal and Disk-Zap - into one program on one disk. The program is called VIP Desktop. From the desktop you have instant access to word processing with a spelling checker always in attendance, data management with mail-merge, spreadsheet financial analysis, telecommunications and disk maintenance. Just move the hand to the volume on the bookshelf and the application is there. 64K req'd. **$149.95**

CoCo 3 owners: See our FULL PAGE AD!

SD Enterprises

(503) 663-2865 P. O. BOX 1233. Gresham, OR. 97030
Please add $3 for shipping. COD orders add an additional $2.25. Personal checks allow 3 weeks for delivery. All other orders shipped the same day.

```
          44
          24
7542      A8        05250        FCB     $A8
7543                05260        RMB     3
7546      52        05270        FCC     /RUN/
          55
          4E
7549      8D        05280        FCB     $8D
754A                05290        RMB     12
7556      4C        05300        FCC     /LIST/
          49
          53
          54
755A      8D        05310        FCB     $8D
755B                05320        RMB     11
7566      53        05330        FCC     /SCREEN 0/
          43
          52
          45
          45
          4E
          20
          30
756E      8D        05340        FCB     $8D
756F                05350        RMB     7
7576      50        05360        FCC     /POKE111,254:DIR/
          4F
          4B
          45
          31
          31
          31
          2C
          32
          35
          34
          3A
          44
          49
          52
7585      8D        05370        FCB     $8D
7586 0D   6F        05380 NEW16A TST     <$6F
7588 27   03        05390        BEQ     *+5
758A 7E   8000      05400 NEW6A  JMP     $8000
758D AF   E4        05410        STX     ,S
758F 34   04        05420        PSHS    B
7591 7D   739D      05430        TST     NUMCHR
7594 26   21        05440        BNE     GETKEY
7596 9E   88        05450        LDX     <$88
7598 A6   84        05460 N1     LDA     ,X
759A 8B   10        05470        ADDA    #$10
759C 8A   8F        05480        ORA     #$8F
759E A7   84        05490        STA     ,X
75A0 C6   20        05500        LDB     #32
75A2 4A             05510 N2     DECA
75A3 12             05520        NOP
75A4 12             05530        NOP
75A5 12             05540        NOP
75A6 12             05550        NOP
75A7 26   F9        05560        BNE     N2
75A9 7D   739D      05570        TST     NUMCHR
75AC 26   05        05580        BNE     N4
75AE 5A             05590        DECB
75AF 26   F1        05600        BNE     N2
75B1 20   E5        05610        BRA     N1
75B3 86   60        05620 N4     LDA     #$60
75B5 A7   84        05630        STA     ,X
75B7 F6   739D      05640 GETKEY LDB     NUMCHR
75BA 8E   739E      05650        LDX     #CHRBUF
75BD A6   84        05660        LDA     ,X
75BF 7A   739D      05670        DEC     NUMCHR
75C2 34   02        05680        PSHS    A
75C4 A6   01        05690 N3     LDA     1,X
75C6 A7   80        05700        STA     ,X+
75C8 5A             05710        DECB
75C9 26   F9        05720        BNE     N3
75CB A6   E0        05730        LDA     ,S+
75CD 35   94        05740        PULS    B,X,PC
75CF 34   14        05750 POLL   PSHS    X,B
75D1 20   E4        05760        BRA     GETKEY
75D3 7D   739D      05770 INKEY  TST     NUMCHR
75D6 27   07        05780        BEQ     NOKEY2
75D8 8D   F5        05790        BSR     POLL
75DA 97   53        05800        STA     <$53
75DC 7E   B68F      05810        JMP     $B68F
75DF 0F   56        05820 NOKEY2 CLR     <$56
75E1 0F   53        05830        CLR     <$53
75E3 7E   B69B      05840        JMP     $B69B
75E6 32   62        05850 NEW19A LEAS    2,S
75E8 1C   AF        05860        ANDCC   #$AF
75EA 7D   739D      05870        TST     NUMCHR
75ED 27   14        05880        BEQ     NEW9A
75EF B6   739E      05890        LDA     CHRBUF
75F2 81   03        05900        CMPA    #$03
75F4 27   10        05910        BEQ     BREAK
```

```
75F6 81   13        05920        CMPA    #$13
75F8 26   09        05930        BNE     NEW9A
75FA 8D   D3        05940        BSR     POLL
75FC 7D   739D      05950 P1     TST     NUMCHR
75FF 27   FB        05960        BEQ     P1
7601 8D   CC        05970        BSR     POLL
7603 7E   82C0      05980 NEW9A  JMP     $82C0
7606 8D   C7        05990 BREAK  BSR     POLL
7608 8E   7774      06000        LDX     #BUFSTR
760B BF   71DA      06010        STX     SPPOS
760E BF   71DC      06020        STX     SPSTRT
7611 4F             06030        CLRA
7612 B7   FF22      06040        STA     $FF22
7615 B7   FFC0      06050        STA     $FFC0
7618 B7   FFC2      06060        STA     $FFC2
761B B7   FFC4      06070        STA     $FFC4
761E B7   FFC6      06080        STA     $FFC6
7621 B7   FFC9      06090        STA     $FFC9
7624 B7   FFCA      06100        STA     $FFCA
7627 B7   FFCC      06110        STA     $FFCC
762A B7   FFCE      06120        STA     $FFCE
762D B7   FFD0      06130        STA     $FFD0
7630 B7   FFD2      06140        STA     $FFD2
7633 7E   AE09      06150        JMP     $AE09    BREAK ROUTINE ADDRESS
7636 32   65        06160 SCRKEY LEAS    5,S
7638 96   6F        06170        LDA     <$6F
763A 34   02        06180        PSHS    A
763C C6   FE        06190        LDB     #$FE
763E D7   6F        06200        STB     <$6F
7640 86   0C        06210        LDA     #$0C
7642 AD   9F A002   06220        JSR     [$A002]
7646 F6   FF22      06230        LDB     $FF22
7649 2B   34        06240        BMI     GRAPH
764B 8E   0400      06250        LDX     #$400
764E A6   80        06260 SLOOPA LDA     ,X+
7650 2A   02        06270        BPL     SNEXTA
7652 86   60        06280        LDA     #$60
7654 81   40        06290 SNEXTA CMPA    #$40
7656 24   06        06300        BHS     SLOOPB
7658 8B   60        06310        ADDA    #$60
765A AD   9F A002   06320        JSR     [$A002]
765E 81   60        06330 SLOOPB CMPA    #$60
7660 25   02        06340        BLO     *+4
7662 80   40        06350        SUBA    #$40
7664 AD   9F A002   06360        JSR     [$A002]
7668 1F   10        06370 SNEXTB TFR     X,D
766A C4   1F        06380        ANDB    #$1F
766C 26   E0        06390        BNE     SLOOPA
766E 86   0D        06400        LDA     #$0D
7670 AD   9F A002   06410        JSR     [$A002]
7674 8C   0600      06420        CMPX    #$600
7677 25   D5        06430        BLO     SLOOPA
7679 35   02        06440        PULS    A
767B 97   6F        06450        STA     <$6F
767D 4F             06460        CLRA
767E 39             06470        RTS
767F 86   1B        06480 GRAPH  LDA     #27
7681 AD   9F A002   06490        JSR     [$A002]
7685 4C             06500        INCA
7686 AD   9F A002   06510        JSR     [$A002]
768A 0F   9C        06520        CLR     <$9C
768C C4   70        06530        ANDB    #$70
768E 54             06540        LSRB
768F 54             06550        LSRB
7690 54             06560        LSRB
7691 8E   7754      06570        LDX     #GTABLE
7694 3A             06580        ABX
7695 96   9B        06590        LDA     <$9B
7697 34   02        06600        PSHS    A
7699 A6   84        06610        LDA     ,X
769B 48             06620        LSLA
769C 48             06630        LSLA
769D 97   9B        06640        STA     <$9B
769F C5   02        06650        BITB    #$02
76A1 27   63        06660        BEQ     COLOR
76A3 EC   84        06670 MONO   LDD     ,X
76A5 34   06        06680        PSHS    D
76A7 34   02        06690        PSHS    A
76A9 9E   BA        06700        LDX     <$BA
76AB CE   7764      06710        LDU     #GTABLE+16
76AE B7   76C5      06720        STA     M1+2
76B1 B7   76D3      06730        STA     M3+2
76B4 08   98        06740        LSL     <$98
76B6 A6   61        06750 MLOOP1 LDA     1,S
76B8 A7   E4        06760        STA     ,S
76BA C6   80        06770 MLOOP2 LDB     #$80
76BC 4F             06780 MLOOP3 CLRA
76BD E5   84        06790        BITB    ,X
76BF 27   02        06800        BEQ     M1
76C1 8A   08        06810        ORA     #8
76C3 E5   88 20     06820 M1     BITB    32,X
76C6 27   02        06830        BEQ     M2
76C8 8A   02        06840        ORA     #2
76CA 54             06850 M2     LSRB
76CB E5   84        06860        BITB    ,X
```

```
76CD 27   02        06870         BEQ    M3
76CF 8A   04        06880         ORA    #$04
76D1 E5   88 20     06890 M3      BITB   32,X
76D4 27   01        06900         BEQ    M4
76D6 4C             06910         INCA
76D7                06920 M4
                    06930 *       EORA   #$0F    DE-COMMENT THIS IF Y
OU WANT THE OUTPUT INVE
RTED(WHITE LINES)
76D7 A6   C6        06940         LDA    A,U
76D9 AD   9F A002   06950         JSR    [$A002]
76DD 54             06960         LSRB
76DE 26   DC        06970         BNE    MLOOP3
76E0 30   01        06980         LEAX   1,X
76E2 6A   E4        06990         DEC    ,S
76E4 26   D4        07000         BNE    MLOOP2
76E6 E6   61        07010         LDB    1,S
76E8 3A             07020         ABX
76E9 6A   62        07030         DEC    2,S
76EB 26   C9        07040         BNE    MLOOP1
76ED 86   1B        07050 FULL    LDA    #27
76EF AD   9F A002   07060         JSR    [$A002]
76F3 48             07070         LSLA
76F4 AD   9F A002   07080         JSR    [$A002]
76F8 EC   63        07090         LDD    3,S
76FA 32   65        07100         LEAS   5,S
76FC 97   9B        07110         STA    <$9B
76FE 97   6F        07120         STA    <$6F
7700 4F             07130         CLRA
7701 04   98        07140         LSR    <$98
7703 04   97        07150         LSR    <$97
7705 39             07160         RTS
7706 04   9B        07170 COLOR   LSR    <$9B
7708 EC   84        07180         LDD    ,X
770A 34   06        07190         PSHS   D
770C 34   02        07200         PSHS   A
770E 8E   7764      07210         LDX    #GTABLE+16
7711 B7   7728      07220         STA    C1+2
7714 B7   7737      07230         STA    C3+2
7717 08   98        07240         LSL    <$98
7719 A6   61        07250 CLOOP1  LDA    1,S
771B A7   E4        07260         STA    ,S
771D C6   C0        07270 CLOOP2  LDB    #$C0
771F 4F             07280 CLOOP3  CLRA
7720 E5   84        07290         BITB   ,X
7722 27   02        07300         BEQ    C1
7724 8A   08        07310         ORA    #8
7726 E5   88 20     07320 C1      BITB   32,X
7729 27   02        07330         BEQ    C2
772B 8A   02        07340         ORA    #2
772D 54             07350 C2      LSRB
772E 54             07360         LSRB
772F E5   84        07370         BITB   ,X
7731 27   02        07380         BEQ    C3
7733 8A   04        07390         ORA    #4
7735 E5   88 20     07400 C3      BITB   32,X
7738 27   01        07410         BEQ    C4
773A 4C             07420         INCA
773B                07430 C4
                    07440 *       EORA   #$0F    DE-COMMENT THIS I
F YOU WANT THE OUTPUT INVE
RTED
773B A6   C6        07450         LDA    A,U
773D AD   9F A002   07460         JSR    [$A002]
7741 54             07470         LSRB
7742 54             07480         LSRB
7743 26   DA        07490         BNE    CLOOP3
7745 30   01        07500         LEAX   1,X
7747 6A   E4        07510         DEC    ,S
7749 26   D2        07520         BNE    CLOOP2
774B E6   61        07530         LDB    1,S
774D 3A             07540         ABX
774E 6A   62        07550         DEC    2,S
7750 26   C7        07560         BNE    CLOOP1
7752 20   99        07570         BRA    FULL
7754      1020      07580 GTABLE  FDB    $1020
7756      1020      07590         FDB    $1020
7758      2020      07600         FDB    $2020
775A      1030      07610         FDB    $1030
775C      2030      07620         FDB    $2030
775E      1060      07630         FDB    $1060
7760      2060      07640         FDB    $2060
7762      2060      07650         FDB    $2060
7764      E0E4      07660         FDB    $E0E4
7766      E3E8      07670         FDB    $E3E8
7768      E2EA      07680         FDB    $E2EA
776A      E6EE      07690         FDB    $E6EE
776C      E1E5      07700         FDB    $E1E5
776E      E9ED      07710         FDB    $E9ED
7770      E7EC      07720         FDB    $E7EC
7772      EBEF      07730         FDB    $EBEF
7774                07740 BUFSTR
          7000      07750         END    START

00000 TOTAL ERRORS
```

Hint . . .

Windows Three

Here are three handy screens to keep on your work disks to call when you want to develop a new procedure or run an old one. Use the BASIC09 editor to create the three procedures. Note: The `vdgint` command is not usually found on the System disk supplied but is in the `MODULES` directory of the Configuration disk. You will need it in your commands directory if you want to call up a 32-column screen.

A 32-column CoCo 1 and 2 Screen

```
PROCEDURE scrn32
SHELL "load vdgint"
SHELL "deiniz /w3"
SHELL "xmode /w3 type=1 pag=16"
SHELL "shell i=/W3&"
PRINT "Press <CLEAR. . ."
```

A 40-column CoCo 3 Graphics Screen

```
PROCEDURE scrn40
DIM path:INTEGER
SHELL "iniz /w1"
OPEN #path,"/w1":WRITE
RUN gfx2(path,"DWSET",6,0,0,40,24,0,1,1)
SHELL "merge sys/stdfonts >/w1"
SHELL "merge sys/stdptrs >/w1"
SHELL "merge sys/stdpats_4 >/w1"
SHELL "display 1b 3a c8 01>/w1"
RUN gfx2(path,"SELECT")
SHELL "shell i=/w1&"
SHELL "shell"
```

An 80-column CoCo 3 Graphics Screen

```
PROCEDURE scrn80
DIM path:INTEGER
SHELL "iniz /w2"
OPEN #path,"/w2":WRITE
RUN gfx2(path,"DWSET",7,0,0,80,24,0,1,1)
SHELL "merge sys/stdfonts >/w2"
SHELL "merge sys/stdptrs> >/w2"
SHELL "merge sys/stdpats_4 >/w2"
SHELL "display 1b 3a c8 01>/w2"
RUN gfx2(path,"SELECT")
SHELL "shell i=/w2&"
SHELL "shell"
```

At the BASIC09 B prompt, save each screen separately as source code that ends up in your root directory (`/D0`); e.g., `save scrn32`. Then pack each of them separately as packed code, which ends up in your commands directory (`/D0/CMDS`); e.g., `pack scrn32`. You may then call a screen by typing, say, `scrn40` at the OS-9 prompt, or by typing `$scrn40` at the BASIC09 prompt.

By keeping the source code in your root directory, you can amend the features of any of the screens by loading the code into BASIC09. For instance, you might want to change the `scrn40` blue color to black by editing `RUN gfx2(path, "DWSET", 6,0,0,40,24,0, 1,1)` to read `RUN gfx2(path, "DWSET", 6,0,0, 40,24,0,2,1)`.

Del Turner, Kamloops, BC

Corrections

"Barden's Buffer" (August 1988, Page 170): Bill Barden has written to make a few points about his timing program. In Mr. Barden's words, "Art Flexser, author of ADOS, correctly points out that the timing program will work only under Radio Shack Disk BASIC 1.1. He [Art Flexser] also adds a few suggestions: 1) Use `POKE&HFF03,&H34` to disable the interrupts from BASIC and `POKE&HFF03,&H35` to enable them. 2) Use an `ORCC` instruction to disable and enable the interrupts in assembly language rather than a `TFR` (a `TFR` will work, however.)"

"The Old Switcheroo II" (August 1988, Page 120): Mark Haverstock wrote to correct some errors in part numbers given in his article. The correct Radio Shack catalog number for the experimenter's box is 270-030, not 270-2301. Similarly, the number for the five-pin in-line DIN jack is 274-006, not 274-005.

"Flight Simulator II" (Review, August 1988): The correct price for *Flight Simulator II* is $34.95, not $24.95 as stated in the review. The program is available only through Radio Shack and cannot be purchased directly from SubLOGIC.

"Escape From Tut's Tomb" (August 1988, Page 58): Due to a production error, part of the listing for `2PART1` is missing from the printed magazine. The missing portions are reproduced below. The files on RAINBOW ON TAPE and RAINBOW ON DISK are unaffected and include the complete program.

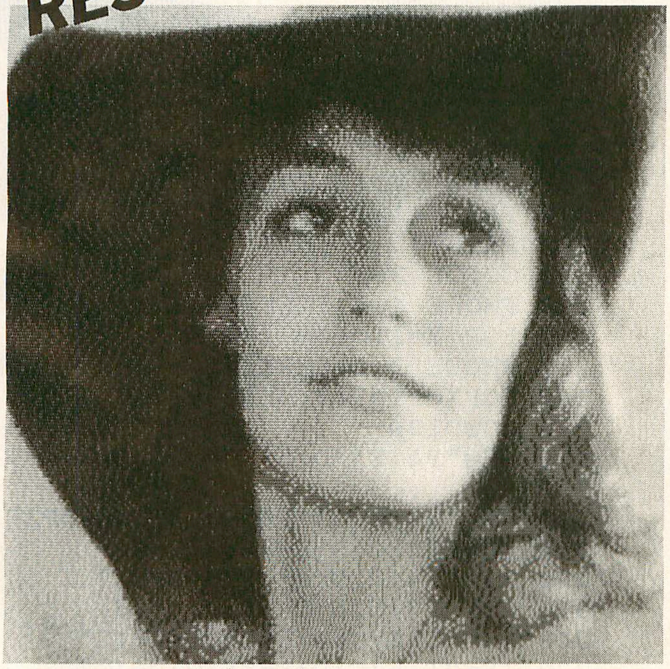
```
690 DATA 32,3,15,14,7,18,1,20
700 DATA 21,12,1,20,9,15,14,19
710 DATA 32,6,9,14,9,19,8,5
720 DATA 4,32,16,1,18,20,20,23
730 DATA 15,12,15,1,4,32,14,5
740 DATA 24,20,32,16,1,18,20,0
750 DATA 0,0,0,0,0,0,0,0
760 DATA 0,0,0,0,0,0,0,0
770 DATA 0,0,0,0,0,134,255,183
780 DATA 43,196,183,43,197,183,4
3,198
790 DATA 183,43,199,183,43,164,1
83,43
800 DATA 165,183,43,166,183,43,1
67,57
810 DATA 182,15,160,129,56,38,10
0,182
820 DATA 30,220,177,30,230,34,32
,37
830 DATA 54,182,30,221,177,30,23
1,34
840 DATA 22,37,44,182,30,222,177
,30
850 DATA 232,34,12,37,34,182,30,
223
860 DATA 177,30,233,34,2,32,24,1
82
870 DATA 30,220,183,30,230,182,3
0,221
880 DATA 183,30,231,182,30,222,1
83,30
890 DATA 232,182,30,223,183,30,2
33,189
900 DATA 21,224,189,21,224,134,3
,183
910 DATA 30,237,182,15,161,183,3
0,220
920 DATA 182,15,162,183,30,221,1
82,15
930 DATA 163,183,30,222,182,15,1
64,183
940 DATA 30,223,57,63,4,0,0,0
950 DATA 0,0,4,0,4,0,4,0
960 DATA 4,0,0,0,0,0,0,0
970 DATA 0,0,0,0,0,0,0,0
980 DATA 194,251,255,255,255,255
,255,255
990 DATA 255,187,185,197,161,222
,7,255
1000 DATA 82,161,197,11,0,0,171,
238
1010 DATA 161,181,1,2,221,161,16
1,2
1020 DATA 4,160,240,0,255,255,25
5,255
1030 DATA 255,255,255,255,255,25
5,255,255
1040 DATA 255,255,255,255,255,25
5,255,255
1050 DATA 255,255,255,255,255,25
5,255,255
```

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type `DATA` at the CoCo SIG> prompt and `INFO` at the TOPIC> prompt.

DIGISECTOR DS-69B NEW VIDEO DIGITIZER FOR THE COCO 3

(AND ALL OTHER COCOS . . .)

SUPER RESOLUTION !!!



COCO 3 SCREEN

USE YOUR COCO 3 TO ITS FULL POTENTIAL!
Use The Micro Works' DIGISECTOR™ DS-69 or DS-69B and your COCO 3's high resolution graphics to capture and display television pictures from your VCR or video camera. The DIGISECTOR™ systems are the only COCO video digitizers available that accurately capture and reproduce the subtle shades of gray in TV pictures!

- **COLOR:** Add color to your screen for dramatic special effects.
- **HIGH RESOLUTION:** 256 by 256 spatial resolution.
- **PRECISION:** 64 levels of grey scale.
- **SPEED!** 8 images per second on DS-69B, 2 images per second DS-69.
- **COMPACTNESS:** Self contained in a plug-in Rompack.
- **EASY TO USE:** Software on disk will get you up and running fast!
- **COMPATIBLE:** Use with a black and white or color camera, a VCR or tuner.
- **INEXPENSIVE:** Our low price puts this within everyone's reach.

POWERFUL C-SEE 3.3 SOFTWARE

This menu-driven software will provide 5 and 16 shades of gray to the screen and to the printer with simple joystick control of brightness and contrast. Pictures taken by the DIGISECTOR™ may be saved on disk by C-SEE 3.3 and then edited by our optional MAGIGRAPH, or by COCO MAX or GRAPHICOM. This versatile new software is included in both DIGISECTORS™

DS-69B and C-SEE 3.3	**$149.95**
DS-69 and C-SEE 3.3	**$ 99.95**

TRADE IN YOUR OLD DIGISECTOR™
If you already have one of The Micro Works' DS-69 or DS-69A DIGISECTORS™, you may return it to us and we will upgrade your unit to a DS-69B.

UPGRADE DS-69A to DS-69B	**$49.95**
UPGRADE DS-69 to DS-69B	**$69.95**

The DS-69B comes with a one year warranty. Cameras and other accessories are available from The Micro Works. DS-88 version available for IBM PC.

NO RISK GUARANTEE
If you are not completely satisfied with the performance of your new DS-69B, you may return it, undamaged, within ten days for a full refund of the purchase price. We'll even pay the return shipping. If you can get any of our competitors to give you the same guarantee, buy both and return the one you don't like. We know which one you'll keep.

Purveyors of Fine Video Digitizers Since 1977. THE MICRO WORKS

Terms: Visa, Mastercard, Check or C.O.D.

P.O. Box 1110 Del Mar, CA 92014 (619) 942-2400

NOVICES NICHE

We're Looking for a Few Good Shorties

Help! The Niche needs more submissions! If you have written a good shortie, please send it in. We're looking for graphics, utilities, educational programs and games (especially games!). How short is a shortie? Well, if you printed out your listing in 32 columns, as we do, it should fit on one half of an 8½-by-11 inch page (be under 12 inches). (Entering `PRINT#-2,CHR$(27)CHR$(81)CHR$(32)` will allow most Epson-compatible printers to `LLIST` a program in 32 columns if you want to check this.)

Graphics

Fright Night

16K
ECB

By Patricia Moos

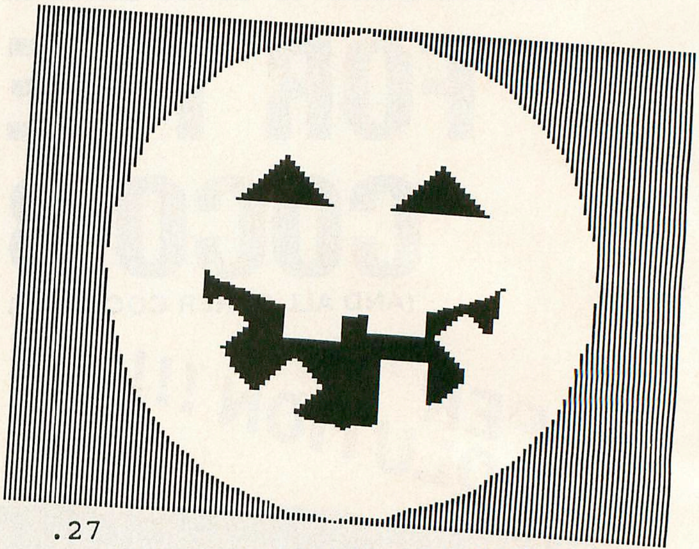
Spook is a short but flashy Halloween program. It draws a jack-o'-lantern on the `PMODE 3` graphics screen, then starts playing an eerie tune. At first the music is slow, but as it repeats it plays faster and faster. Finally, the music stops and the image flashes.

Because of the `GOTO 230` statement in Line 270, the pumpkin will flash endlessly after it finishes its song. If you would like your jack-o'-lantern to run endlessly from start to finish, replace Line 270's `GOTO 230` statement with `GOTO 10` and add these two lines:

```
225 FOR T=1 TO 20
265 NEXT T
```

Put the monitor in your window and share the specter with trick-or-treaters on Halloween night.

The listing: `SPOOK`



```
10 PMODE 3,1
20 PCLS
30 SCREEN 1,1
40 CIRCLE(128,96),95,8
50 CIRCLE(128,96),60,8,1,0,.08
60 DRAW"BM183,118;H10;G10;F14"
70 CIRCLE(128,96),60,8,1,.10,.18
80 DRAW"BM158,143;U15;L15;D25"
90 CIRCLE(128,96),60,8,1,.21,.32
100 DRAW"BM108,150;E10;H10;G14"
110 CIRCLE(128,96),60,8,1,.35,.4
2
120 DRAW"BM78,128;E10;H10;G5"
130 CIRCLE(128,96),60,8,1,.46,.5
0
140 CIRCLE(128,74),75,8,.50,.10,
.20
150 DRAW"BM156,107;D10;L20;U8"
160 CIRCLE(128,74),75,8,.50,.24,
.27
170 DRAW"BM125,111;D10;L20;U12
180 CIRCLE(128,74),75,8,.50,.31,
.40
190 DRAW"BM80,70;E20;F20;L37"
200 DRAW"BM140,70;E20;F20;L37"
210 PAINT(100,40),8,8
215 PAINT(1,1),6,8
220 GOSUB 290
230 PMODE 4,1:SCREEN1,1
240 FOR X=1TO100 :NEXT X
250 PMODE 3,1:SCREEN1,1
260 FORX=1TO100:NEXT X
270 GOTO230
290 B$="P4;E#;D;E+;P4;D+;C;D+;P4
"
300 C$="O4;C;O3;A+;G;E-;G;A+;P2"
310 D$="T3;C;D;E-;F;G;D+G;"
320 E$="T4;C;D;E-;F;G;D+G;"
327 G$="T7;C;D;E-;F;G;D+;G
328 H$="T10;C;D;E-;F;G;D+;G"
329 I$="T15;C;D;E-;F;G;D+;G"
340 PLAY D$+B$+D$+C$
350 PLAY E$+B$+E$+C$
370 PLAY G$+B$+G$+C$
380 PLAY H$+B$+H$+C$
390 PLAY I$+B$+I$+C$
400 RETURN
```

Ad Infinitum

CoCo 3

By Rick Weshenfelder

If you're one of those people who liked the Lava Lamp, you'll love *Eyecatcher.* Just type in, load and run the program to see an infinite number of CoCo 3 graphics. Press any key to start the program over again.

I used the speed-up poke (`POKE 65497,0`) because the program has to do quite a bit of number crunching. (Note: CoCo 2 users should use the CoCo 2-specific speed-up poke in translating this program to their machines.)

If you like to fiddle with the programs you type in, you might try changing the values of some of the variables to see what will happen. `F` controls the spacing between lines as they are drawn. `TI` controls how often the colors will change, and `TM` is responsible for resetting the program. There are more, but these will do for a start.

If you want to tinker more with the program, I have some suggestions. Try, for example, adding a routine to let the number keys change the background color. Remove the variable `TM` entirely for a continuous picture, or make an option that switches between continuous and timed pictures.

The listing: `EYECATCH`

```
10 '>>> EYE CATCHER <<<
20 ' RICK WESHENFELDER
30 CLS:POKE65497,0:ONBRKGOTO180:
TIMER=0
40 WIDTH80:PALETTERGB:PALETTE0,0
:HSCREEN2:HCOLOR1,0
50 F=2:F1=.995^F:F2=1-F1
60 HA=RND(320):HB=RND(320):VA=RN
D(192):VB=RND(192)
70 H1=RND(0)*SGN(160-HA):V1=(1-A
BS(H1))*SGN(96-VA)
80 H1=H1*F:V1=V1*F
90 PC=RND(8):PALETTE(8+PC)-1,(PC
*8)-1:TI=TIMER:IFTI>=50THENTI=0:
TIMER=0:TM=TM+1:HC=(HC+1)*-(HC<1
5)
100 IFTM=5THENTM=0:HCLS:GOTO50
110 IF HA+H1>319 OR HA+H1<0 THEN
 HA=HA-H1:HCOLORHC,0:GOTO70
120 IF VA+V1>191 OR VA+V1<0 THEN
 VA=VA-V1:HCOLORHC,0:GOTO70
130 HA=HA+H1:VA=VA+V1:HB=HB*F1+H
A*F2:VB=VB*F1+VA*F2
140 HLINE(HA,VA)-(HB,VB),PSET
150 HLINE(319-HB,VB)-(319-HA,VA)
,PSET
160 HSET(HA,VA,15-HC):HSET(HB,VB
,15-HC):HSET(319-HA,VA,15-HC):HS
ET(319-HB,VB,15-HC)
170 IFINKEY$=""THEN110ELSEHCLS:T
IMER=0:TM=0:GOTO50
180 POKE65496,0:PALETTE0,32:WIDT
H32:PALETTERGB:END
```

Tying up DRAW Strings

32K
ECB

By Keiran Kenny

With *CopyPix* you can use `LINEINPUT` to enter `DRAW` commands and see what you have drawn as soon as you press ENTER.

On running the program you will see a text screen with the word *Draw* at the upper-left corner. Type in one of the `DRAW` commands (`U15`, for example — see your Extended Color BASIC manual) and press ENTER. The program then shifts you to the `PMODE 4` screen to show what you have done. Pressing the space bar returns you to the text screen for another prompt. Add a few more commands, press ENTER again, and watch your drawing grow. You can enter `DRAW` strings up to a maximum of about four text screen lines in length, but you may find that entering commands one to four at a time is preferable.

When the program starts, the cursor is at the center of the screen (128,96). Enter a `BM` or `B` command if you want to change the cursor position at any time. Otherwise, each new line will follow on from the end of the last line you drew.

If a cassette recorder is connected to your CoCo, you can save your pictures to tape. To save a picture, position the tape and enter `SP` (save picture) at the `LINEINPUT` prompt, then press Record and Play. To load a saved picture, position your tape and enter `LP` (load picture), then press Play on the recorder. (Do not put space between the `DRAW` prompt and either `SP` or `LP`; doing so will result in an error.) When you load a picture from tape, the cursor will be at Position 128,96.

The listing: `COPYPIX`

```
0 'COPYPIX' BY KEIRAN KENNY,
   SYDNEY, 1988.
10 CLS
20 GOTO170
30 LINEINPUT"DRAW";D$
40 IFD$="SP"THENPMODE4,1:COLOR0,
1:PCLS:SCREEN1,1:GOSUB80:CSAVEM"
",PEEK(&HBA)*256,PEEK(&HB7)*256-
1,&HB44A:GOTO150
50 IFD$="LP"THENN=0:PMODE4,1:COL
OR0,5:PCLS:SCREEN1,1:CLOADM:GOTO
120
60 PMODE4,1:COLOR0,5:PCLS:SCREEN
1,1
70 IFN THENGOSUB80:GOTO110ELSE11
0
80 PG=1
90 FORT=5TO8:PCOPYT TOPG:PG=PG+1
:NEXT
100 RETURN
110 DRAWD$
120 N=1
130 PG=5
140 FORT=1TO4:PCOPYT TOPG:PG=PG+
1:NEXT
150 K$=INKEY$:IFK$<>CHR$(32)THEN
150
160 GOTO30
170 PCLEAR8:GOTO30
```

Utility

Seeing the Bigger Picture

CoCo 3

By Erich Sweaney

CoCo Plus is a short program that increases the CoCo 3's `HSCREEN` 2 or 4 screen by six vertical pixels (from 192 to 198). To use 198 vertical pixels in your own programs, type in lines 40 and 70 every time you use the `HSCREEN` 2 or 4 command.

The `HCIRCLE` command does not work properly when you enter it between vertical locations 192 and 198, and the `HPAINT` command requires a little experimentation, but all the other commands work fine. Type in and run this listing for a demonstration.

The listing: `COCOPLUS`

```
0 REM COCO PLUS
10 REM INCREASES GRAPHICS FOR TH
E COCO 3 FROM 192 TO 198
20 REM BY ERICH SWEANEY
30 PALETTE RGB
40 HSCREEN 2:POKE &HFF98,128:POK
E &HFF99,62
50 REM MAKES SCREEN LARGER
60 REM CHANGE POKE &HFF99,62 TO
POKE &HFF99,61 TO USE HSCREEN 4
70 POKE &HE7BA,201
80 REM LET'S HLINE GOTO 198
90 HCLS8
100 PALETTE 7,37
110 HCOLOR 7
120 HLINE(0,0)-(320,198),PSET,B
130 HCOLOR 2:HLINE(0,0)-(320,192
),PSET,B
140 HPRINT(2,23),"OLD 192":HCOLO
R 7:HPRINT(20,24),"NEW 198"
150 HCOLOR 3:HLINE(0,192)-(320,1
98),PSET,B
160 HPAINT(10,197),4,3
170 REM YOU MUST SET THE LOWEST
POINT DOWN,WHEN HPAINTING BETWEE
N 192-198 OR IT WONT WORK WRIGHT
180 HCOLOR 2:HCIRCLE(250,194),10
190 REM SORRY HCIRCLE DOES NOT W
ORK GOOD
200 REM MOST OTHER HSCREEN GRAPH
IC COMMANDS WORK
210 REM TO USE HSCREEN 2,4 IN YO
UR PROGRAMS JUST TYPE LINE 10 AN
D 40 IN WHEN EVER YOU USE HSCREE
N
220 HPRINT(2,2),"NEW GRAPHICS CA
PABILTY"
230 HCOLOR 5:HPRINT(2,3),"FOR HS
CREEN 2 AND 4"
240 HCOLOR 4:HPRINT(2,4),"CHANGE
S FROM 192 TO 198"
250 HCOLOR 6:HPRINT(2,5),"BY"
260 HCOLOR 7:HPRINT(2,6),"ERICH
SWEANEY"
270 POKE 65497,0:FOR L=0 TO 300
STEP 2:HCOLOR RND(8):HLINE(L,80)
-(L+20,180),PSET:HLINE(L,180)-(L
+50,80),PSET:NEXT L
280 GOTO 280
```

Game

Taking on the One-Armed Bandit

4K

By Kenneth Carlin

I recently rediscovered a game I had written more than five years ago that is still fun to play (and it will run on *every* CoCo there is, from the old 4K non-extended all the way to the 512K CoCo 3) — it's a Low-Res interpretation of the classic slot machine.

Game play is extremely simple. After the title screen, you are prompted to press P to play the game; this constantly seeds the random number generator with new values, ensuring a completely new game every time. You are then prompted for a bet between one and five tokens. The windows will flash random blocks of graphics, simulating the spin of the wheel. If the symbols match after the machine has stopped, you win. Payoff is as follows:

Window	Payoff
yellow in 1st	2x
yellow in 1st and 2nd	5x
3 blue or 2 blue and a bar	10x
3 red or 2 red and a bar	20x
3 white or 2 white and a bar	35x
3 cyan or 2 cyan and a bar	50x
3 magenta or 2 magenta and a bar	100x
3 orange or 2 orange and a bar	200x

In case you hadn't guessed, the bar mentioned above is the

***** in Window 3. With any winning combination, the payoff is flashed on the screen along with the message "Winner!" Play ceases only when you run out of money or grow tired of playing.

There are a few things you may want to add to this game to make it more enjoyable. Personally, I like to pull back on some sort of "arm" when I play a slot machine. If you have a joystick, you can incorporate it into the program by following a few short steps. First, retype Line 28 so that it reads as follows:

```
28 Q=JOYSTK(0):IFJOYSTK(1)>30THE
NPRINT@389," PLEASE RESET THE AR
M":GOTO28
```

Now retype Line 29 to read:

```
29 PRINT@389,"  PULL THE ARM BAC
K":Z=JOYSTK(0):IFJOYSTK(1)<>63TH
EN29ELSEPRINT@340,""GOTO4
```

These two changes allow the joystick to function as the slot machine's arm. If prompted to reset the arm, push the joystick all the way up. Then give it a pull. Once the joystick is pulled all the way down, the machine will engage. If you want sound in the game, add `:SOUND100,1` to the end of Line 8, and change the end of Line 23 to read `ML=ML+1:SOUND1,1:NEXT`. That's about it. It's rather short, but I wrote it to stay within the constraints of a 4K computer. Feel free to dress it up in any way you see fit. Chances are you have more than enough memory to add quite a few features.

The listing: `SLOTS`

```
1 CLS:CLEAR270:ML=25:PRINT@41,"O
NE ARM BANDIT":PRINT@360,"BY  KE
N  CARLIN":A$="  ":B$="    ":C$="
     ":D$=CHR$(142):E$=CHR$(139)
2 FORA=1TO5:D$=D$+CHR$(131):E$=E
$+CHR$(140):NEXT:D$=D$+CHR$(141)
:E$=E$+CHR$(135):F$=CHR$(133)+C$
+CHR$(138):G$=A$+D$+B$+D$+B$+D$:
H$=A$+F$+B$+F$+B$+F$:I$=A$+E$+B$
+E$+B$+E$:J$=G$+B$+H$+B$+I$:DIMK
$(8):D=159:FORC=1TO7:FORE=1TO2
3 K$(C)=K$(C)+CHR$(D)+" ":NEXTE:
K$(C)=K$(C)+CHR$(D):D=D+16:NEXTC
:K$(8)="*****":GOSUB32:CLS:DIMG(
3):PRINT@192,J$:GOTO24
4 H(1)=RND(RND(7)):H(2)=RND(RND(
7)):H(3)=RND(7)+1
5 FORK=1TO3:FORE=1TO50:ON K GOTO
 6, 7, 8
6 PRINT@227,K$(RND(7));
7 PRINT@237,K$(RND(7));
8 PRINT@247,K$(RND(7)+1);
9 NEXTE:PRINT@227+((K-1)*10),K$(
H(K));
12 NEXTK:FORT=1TO500:NEXT:C1=POI
NT(6,14):C2=POINT(26,14):C3=POIN
T(46,14)
13 IF((C1=C2)AND(C2=C3))OR((C1=C
2)AND(C3=-1))THEN14ELSEIF(C1=C2)
ANDC1=2THEN14ELSEIFC1=2THENMO=BE
*2:PA$=" 2 TO 1":GOTO23ELSE24
14 C1=C1-1
15 ON C1 GOTO 16, 17, 18, 19, 20
, 21, 22
16 MO = BE*5:PA$=" 5 TO 1":GOTO2
3
17 MO = BE*10:PA$="10 TO 1":GOTO
23
18 MO = BE*20:PA$="20 TO 1":GOTO
23
19 MO = BE*35:PA$="35 TO 1":GOTO
23
20 MO = BE*50:PA$="50 TO 1":GOTO
23
21 MO = BE*100:PA$="100 TO 1":GO
TO23
22 MO = BE*200:PA$="200 TO 1"
23 PRINT@332,"WINNER !":PRINT@13
5,"PAYOFF IS "PA$:FORX=1TOMO:PRI
NT@56,ML;:ML=ML+1:NEXT
24 IFML=0THEN30ELSEPRINT@45,"MON
EY LEFT:"ML;:PRINT@79,"THIS BET:
 ?":PRINT@389,"PLACE YOUR BET  (
1-5)":Y$=INKEY$
25 BE$=INKEY$:Z=RND(99999):IFBE$
=""THEN25ELSEPRINT@320,"":PRINT@
135,"":BE=VAL(BE$):IFBE<1ORBE>5T
HEN25
26 IFML-BE<0THENPRINT@448,"*YOU
DO NOT HAVE THAT MUCH LEFT*";:FO
RT=1TO1800:NEXT:PRINT@448,"":GOT
O25
27 PRINT@88,BE:ML=ML-BE:PRINT@56
,ML:PRINT@389,""
28 '
29 PRINT@390,"":GOTO4
30 CLS
31 PRINT@198,"YOU ARE OUT OF MON
EY":PRINT@294,"CARE TO PLAY AGAI
N ?":PRINT@334,"(Y/N)":P$=INKEY$
:IFP$=""THEN31ELSEIFP$="Y"THEN1E
LSECLEAR200:END
32 PRINT@192,J$:PRINT@227,K$(RND
(7));:PRINT@237,K$(RND(7));:PRIN
T@247,K$(RND(8));:PRINT@455,"PRE
SS <P> TO PLAY":Z=RND(9999):W$=I
NKEY$:IFW$<>"P"THEN32ELSERETURN
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

A continuation of last month's "opposites" game, for more advanced students

Two for the Price of One

By Fred B. Scerbo
Rainbow Contributing Editor

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

Over the last two months I've introduced two brand-new programs, *Opposite Concepts 1* and *Match Game of Opposites 1*. These programs were designed to train the young user in telling the difference between opposite concepts by employing a set of 20 pairs of examples (i.e., hot versus cold). *Match Game* took these concepts one step further and made recall of the terms a great deal of fun. (You could even have adults play this variation of *Concentration* just for fun, since both young and old would have the same chances of winning. Remember, you can't put a price tag on quality time you spend with your kids — this is just another tool for that goal.)

This month, I'm offering you a set of 20 additional opposite concepts. These concepts will be a little more abstract, with terms like "in front of" and "behind" or "talk" and "listen." Those of you who want details on how these programs work should refer to the last two months' articles, rather than having all the technical lingo repeated here.

How these 20 came into being is almost an adventure in itself. After I had struggled to come up with the first set, one of the elementary teachers who has since started using these programs commented that she would hardly be able to come up with 20 sets of opposites to begin with. When I remarked to her that I had already developed a second set of 20, with the graphics to go along with it, she was quite surprised. She then dared me to come up with a third set of 20. (Believe it or not, after sitting down with a few of my own upper-level students for a half hour, we actually were able to come up with 20 more, as well as the graphics to go along with them. I'll save those for several months, though, to see what your reaction is to these first installments. We don't want to overdo a good thing.)

Too Much Typing!

If you have typed in the last two months' programs, I am going to give you a few pointers on how to save some time in getting both new programs quickly into your CoCo. Remember, the easiest way to get these programs error-free is by subscribing to either RAINBOW ON TAPE or RAINBOW ON DISK. If you don't have a subscription, I'll now mention two quick ways to save some hacking time.

Tape Only?

Those of you without a disk drive will not be able to use the `MERGE` command found in Extended Disk BASIC. In that case, if you want to type in the listing shown here, you should load your error-free copy of *Opposite Concepts 1* from two months ago. Next, follow the steps shown below.

1. With the program loaded, type `DEL 395-790` and press ENTER.
2. Retype lines 2, 85, 90 and 95 from this month's new listing.
3. Type in lines 395 through 790 from the new listing.
4. Save your new listing to tape with a different filename, such as `OPOSITE2`.

Now you may take some steps to use this data in *Match Game of Opposites*, following these steps:

1. Reload `OPOSITE2`.
2. Type `DEL 0-390` and press ENTER.
3. Type `DEL 795-` and press ENTER.
4. Delete lines:

400
410
420
430
440
450
460
470
480
490
500
510
520
530
540
550
560
570
580
590
600
610
620
630
640
650
660
670
680
690
700
710
720
730
740
750
760
770
780
790

We do not need these `DATA` lines in *Match Game of Opposites*. Simply type the line number and press ENTER.

5. Type `RENUM 110,395,0` and press ENTER.
6. From last month's listing type in lines 1 through 105 and 310 through 620. Also, retype Line 2 to read `2 REM*MATCH GAME OF OPPOSITES 2*`.
7. Save the entire program and test it for errors. You may want to use a different filename, such as `MATCH2`.

You will now have copies of both programs with all the new data in place. If you find this too confusing, simply type in the listing as you see it here.

Disk Users Only!

Disk users have a much easier time with this, since you can use the `MERGE` command. To get `OPOSITE2`, follow the same instructions as you would above for tape. What you are actually doing is deleting the old `DATA` lines from `OPOSITE1` and typing in the new lines 395 through 790. Also be sure to retype lines 2, 85, 90 and 95.

However, for the next program you can save a great deal of time by using the `MERGE` command. To do this, after you have saved `OPOSITE2` to disk,

---

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

follow steps 1 through 5 above for *Match Game of Opposites*. From that point on, do the following:

6. On a new formatted disk, save this new `DATA` list by typing `SAVE"VOL2",A` and press ENTER. This saves the lines to your disk in ASCII.
7. Load your copy of *Match Game of Opposites* from last month's issue. Next, place the new disk with `VOL2` on it in your drive, type `MERGE "VOL2"` and press ENTER. The new lines will now take the place of all the old data, and the program should be ready to run, provided you have not made any typing errors. Also, retype Line 2 as `2 REM *Match Game of Opposites 2*`.
8. Save this new version with the filename `MATCH2` or some other appropriate name. You don't want to use the same filename as `VOL1`, since you would be killing the old file and writing over it with your new program.

Both programs are now ready to run. Refer to the last two months' issues for instructions on how to run the programs. Only the material covered will be different.

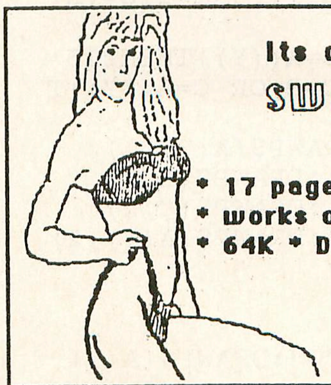
Next month will be the final chapter in this series of early childhood education programs. I'll list a third, totally different program, which will introduce this material inserted into sentences while still using our graphics. Let me know if these programs prove as valuable to you as you they have to our elementary students! ☐

Editor's Note: For your convenience, both programs (`OPOSITE2` and `MATCH2`) will appear on this month's issue of RAINBOW ON TAPE *and* RAINBOW ON DISK. *This will ensure that those of you who want bug-free copies will not have to merge for* `MATCH2`.

✓			
50	170	565	95
95	127	605	108
165	71	635	94
260	237	675	235
340	174	705	151
400	194	750	192
440	93	785	187
475	241	910	32
525	4	END	113

The listing: `OPOSITE2`

```
1 REM*****************************
2 REM* OPPOSITE CONCEPTS VOL.2 *
3 REM*   COPYRIGHT (C) 1988    *
4 REM*    BY FRED B. SCERBO    *
5 REM*    60 HARDING AVENUE    *
6 REM*  NORTH ADAMS, MA 01247  *
7 REM*****************************
10 CLEAR3000
15 CLS0:PRINTSTRING$(32,188);STR
ING$(32,156);:FORI=1TO 256 :READ
 A:PRINTCHR$(A+128);:NEXT
20 PRINTSTRING$(32,195);STRING$(
32,179);
25 PRINT@422,"  BY FRED B.SCERBO
  ";:PRINT@454," COPYRIGHT (C) 1
988 ";
30 DATA126,124,124,125,117,124,1
24,122,126,124,125,117,124,124,1
25,117,124,124,124,116,126,117,1
24,126,125,117,124,124,117,124,1
24,124
35 DATA122,,,117,117,115,115,122
,123,115,119,117,,,117,117,115,1
15,115,,122,,,122,,117,115,114,1
17,115,115,115
40 DATA122,,,117,117,,,,122,,,11
7,,,117,,,,117,,122,,,122,,117,,
,,,,117
45 DATA124,124,124,124,116,,,32,
120,,,116,124,124,124,116,124,12
4,124,116,124,,116,124,,116,124,
124,116,124,124,124
50 DATA46,44,44,45,37,,,32,42,,,
37,44,44,45,36,44,44,45,36,46,,3
6,46,32,37,44,44,36,44,44,45
55 DATA42,,,37,37,35,35,34,43,35
,35,37,,,37,33,35,35,39,,42,,,42
,,37,35,34,33,35,35,39
60 DATA42,,,37,37,,,42,42,,37,37
 ,,,37,37,32,,,,42,33,32,42,33,37
 ,,,37,,,
65 DATA44,44,44,44,36,44,44,40,4
4,44,44,36,44,44,44,36,44,44,44,
36,44,36,44,44,44,36,44,44,36,44
,44,44
70 X$=INKEY$:IFX$<>CHR$(13)THEN7
0
75 DIM P$(20,2),A$(6),B$(20),C$(
20),A(20),N(20),B(4),C(4),D(4),E
(4),F(4),AO(20)
80 FORI=1TO3:READ C(I),D(I),E(I)
,F(I):NEXT:FORI=1TO6:READA$(I):N
EXT:FORI=1TO20:READP$(I,1),B$(I)
,P$(I,2),C$(I):NEXT
85 COLOR1,0
90 REM TITLE
95 CLS:PRINTSTRING$(32,"=");:PRI
NT@68,"OPPOSITE CONCEPTS VOL.2":
```



Its our all new

SWIMSUIT ISSUE

Graphics Clipbook

- 17 pages of High Res. graphics
- works on CoCo 1,2, and 3
- 64K * Disk Only * $15.00

Baron Products
3937 Shady Hill
Dallas, TX 75229

```
PRINT@134,"A) REVIEW ALL TERMS":
PRINT@198,"B) QUIZ GRAPHICS":PRI
NT@262,"C) QUIZ TERMS ONLY"
100 PRINT@324,"<<<SELECT YOUR CH
OICE>>>"
105 PRINT:PRINTSTRING$(32,"=");:
PRINT@420,"DEDICATED TO THE STUD
ENTS":PRINTTAB(8)"OF JOHNSON SCH
OOL"
110 X$=INKEY$:X=RND(-TIMER):IFX$
="A"THEN365ELSEIFX$="B"THEN115EL
SEIFX$="C"THEN795ELSE110
115 CLS0:PMODE0,1:PCLS1
120 LINE(0,0)-(254,170),PRESET,B
125 LINE(6,4)-(122,82),PRESET,BF
130 LINE(128,4)-(248,82),PRESET,
B
135 LINE(6,86)-(122,164),PRESET,
B
140 LINE(128,86)-(248,164),PRESE
T,B
145 DRAW"BM26,188C0NU10R10NU10BR
6R10U6L10U4R10BR6NR10D4NR10D6R10
BR12BU6NE4D2F4BR6R10U6L10U4R10BR
6ND10R10D4NL10BR6NR10D6U10R10D10
BR6NR10U10R10BR6NR10D4NR10D6R10B
R10U10NL4R10D4NL10D6NL14BR6U10R1
0D4NL10D6BR6U10R10D4L10R4F6BR6E4
U2H4"
150 DATA130,6,246,80,6,86,120,16
2,130,86,246,162
155 PAINT(2,2),0,0:PCOPY1TO3
160 PMODE0,4:PCLS1
165 LINE(0,0)-(254,170),PRESET,B
F
170 LINE(8,6)-(120,80),PSET,BF
175 PCOPY4TO2:PMODE0,1:SCREEN1,1
180 DATA"BM2,8C1","BM130,8C0","B
M2,90C0","BM130,90C0","BM2,48C0"
,"BM130,48C0"
185 FORI=1TO20
190 A(I)=RND(20):IFN(A(I))=1THEN
190
195 N(A(I))=1:NEXTI:FORY=1TO20:C
OLOR1,0
200 FORI=2TO4
205 B(I)=RND(3)+1:IFN(B(I))=0THE
N205
210 N(B(I))=0:NEXTI:FORI=1TO4:N(
I)=1:NEXT
215 B=RND(20):IFB=A((Y))THEN215
220 C=RND(20):IFC=B OR C=A((Y))T
HEN220
225 DRAW A$(1):DRAWP$(A(Y),1)
230 DRAW A$(B(2)):DRAWP$(B,2)
235 DRAW A$(B(3)):DRAWP$(C,2)
240 DRAW A$(B(4)):DRAWP$(A(Y),2)
245 COLOR1,0
250 Z=0
255 PMODE0,4
260 DRAW A$(1)+"C0":DRAWP$(A(Y),
1)
265 DRAW A$(B(2))+"C1":DRAWP$(B,
2)
270 DRAW A$(B(3))+"C1":DRAWP$(C,
2)
275 DRAW A$(B(4))+"C1":DRAWP$(A(
Y),2)
280 PMODE0,1:SCREEN1,1
285 LINE(8,6)-(120,80),PSET,B
290 X$=INKEY$:IFX$=" "THEN300ELS
EIFX$="@"THEN965
295 COLOR1,0:LINE(8,6)-(120,80),
PRESET,B:GOTO285
300 Z=Z+1:IFZ=4THENZ=1
305 COLOR1,0:LINE(C(Z),D(Z))-(E(
Z),F(Z)),PSET,B
310 X$=INKEY$:IFX$=" "THEN300ELS
EIFX$=CHR$(13)THEN320ELSEIFX$="@
"THEN965
315 COLOR1,0:LINE(C(Z),D(Z))-(E(
Z),F(Z)),PRESET,B:GOTO305
320 IFZ+1=B(4)THEN330
325 NW=NW+1:FORK=1TO5:PMODE0,4:S
CREEN1,1:SOUND10,3:PMODE0,1:SCRE
EN1,1:SOUND1,3:NEXTK:GOTO305
330 NC=NC+1:PMODE0,4:PCLS1:LINE(
0,40)-(256,126),PRESET,B:LINE(6,
44)-(124,122),PRESET,B:LINE(130,
44)-(248,122),PRESET,B:PAINT(2,4
2),0,0
335 DRAW A$(5):DRAWP$(A(Y),1)
340 DRAW A$(6):DRAWP$(A(Y),2)
345 SCREEN1,1
350 X$=INKEY$:IFX$<>CHR$(13)THEN
350
355 PMODE0,1
360 PCOPY3TO1:SCREEN1,1:PCOPY2TO
4:NEXTY:GOTO965
365 PMODE0,2:PCLS1:SCREEN1,1:LIN
E(0,40)-(256,126),PRESET,B:LINE(
6,44)-(124,122),PRESET,B:LINE(13
0,44)-(248,122),PRESET,B:PAINT(2
,42),0,0
370 FORI=1TO20:DRAW A$(5):DRAWP$
(I,1)
375 DRAW A$(6):DRAWP$(I,2)
380 X$=INKEY$:IFX$<>CHR$(13)THEN
380
385 COLOR1,0:LINE(8,46)-(122,120
),PSET,BF:LINE(132,46)-(246,120)
,PSET,BF:NEXTI
390 RUN
395 DATA"BR24BD10R20F10L20NH10R6
0M+20,+8BL20NL60BR20M-20,+8L60G1
0R20E10L20U16BL8NL16BD4NL16BD4NL
16BD4NL16BD4NL16BD32BR10U6NR10U4
R10BR6ND10R10D4NL10D6BR6R10U6L10
U4R10BR6R6ND10R6"
400 DATA FAST
405 DATA"BR42BD44NR30H10U10E10R2
0F8D10G4L16H6U4E4R8F4D2G2L4H2BD8
```

```
R16E6R6NE6F4D4NL4G4L6BU8BR4RBD34
BL46R10U6L10U4R10BR6D10R6BR6U10R
10D10NL10BR6NU10R6NU8R6U10"
410 DATA SLOW
415 DATA"BR32BD4R60D46L60U46BF2R
10NF4R18ND6R18NG4R10D5NG4D16NL6D
16NH4D5L10NH4L18NU6L18NE4L10U5NE
4U16NR6U16NF4U5BD23BR28F8U2H8NU2
M-18,-4BD46BL26NU10R10U6NL10U4NL
10BR6NR10D4NR10D6R10BR6U6NR10U4R
10BR6ND10R10D10NL10BR6U10R10D4L1
0R4F6BR6NR10U6NR10U4R10"
420 DATA BEFORE
425 DATA"BR32BD4R60D46L60U46BF2R
10NF4R18ND6R18NG4R10D5NG4D16NL6D
16NH4D5L10NH4L18NU6L18NE4L10U5NE
4U16NR6U16NF4U5BD23BR28F8U2H8NU2
M+18,-4BD46BL56U10R10D4NL10D6BR6
U6NR10U4R10BR6R6ND10R6BR6NR10D4N
R10D6R10BR6U10R10D4L10R4F6"
430 DATA AFTER
435 DATABF30E8R2E2NH6R2E2R4E2NH6
R6E2R6NH6R4F2R6F2R4NH8F2R2F2R2F8
H2L2G2L2G2L4G2L6G2L20H2L6H2L4H2L
2H2NL2F2R2F2R4F2R6H4U2H2U4E2BR30
F2D4G2D2G4BU4BL10U8F2D4L4U6D8H2U
4BG36BD8U10R10D4NL10D6BR6NU10R6N
U8R6NU10BR6U10R10D4NL10D6BR6U10D
4NE4F6BR6NR10U6NR10U4R10
440 DATA AWAKE
445 DATA"BF24BR4F2R2F2NG6R2F2R6F
2NG6F2R8NG6R8E2R6NG8E2R4E2R2E2R2
NG10E2BU20BL70R10G10R10BR6RBR6RB
R6NR10E10NL10BD10BR6RBR6RBR6NR10
E10NL10BD10BR6RBR6RBL86BD54U10R1
0D4NL10D6BR6R10U6L10U4R10BR6D10R
8BR6NR10U6NR10U4R10BR6NR10D4NR10
D6R10BR6U10R10D4L10"
450 DATA ASLEEP
455 DATA"BD6BF38R8E4U10R4U6L4U6H
4L16G4D6L4D6R4D10F4R8BU6NE4NH4BU
8NLNR2BU6BL4NR2BR6R2BR40BD20R8E4
U10R4U6L4U6H4L16G4D6L4D6R4D10F4R
8BU6NE4NH4BU8NLNR2BU6BL4NR2BR6R2
BL54BD44NU10R6NU8R6NU10BR6U10BR6
R6ND10R6BR6D10U6R10U4D10"
460 DATA WITH
465 DATA"BR60BD44R8E4U10R4U6L4U6
H4L16G4D6L4D6R4D10F4R8BU6NE4NH4B
U8NLNR2BU6BL4NR2BR6R2BL52BD44NU1
0R6NU8R6NU10BR6U10BR6R6ND10R6BR6
D10U6R10U4D10BR6U10R10D10NL10BR6
NU10R10U10BR6R4ND10R4"
470 DATA WITHOUT
475 DATA"BR60BD50R8E4U10R4U6L4U6
H4L16G4D6L4D6R4D10F4R8BU6NE4NH4B
U8NLNR2BU6BL4NR2BR6R2BU12NL12R4U
2NL16U2NL30R14L2D8NF2NG2BD46BL44
NU10R6NU8R6NU10BR6NU10BR6R10U6L1
0U4R10BR6NR10D4NR10D6R10"
480 DATA WISE
```

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

Back Issue Availability

For greater convenience, order RAINBOW Back Issues through the Rainbow Magazine Services area of our Delphi CoCo SIG.

BACK ISSUES STILL AVAILABLE

Have you explored the wealth of information in our past issues? From our very first, four-page issue to many with more than 300 pages of material, it's all just for CoCo users — a great way to expand your library!

A WORLD OF INFO AT A BARGAIN PRICE

All back issues sell for the single issue cover price. In addition, there is a $3.50 charge for the first issue, plus 50 cents for each additional issue for postage and handling if sent by United Parcel Service. There is a $5 charge for the first issue, plus a $1 charge for each additional issue on orders sent by U.S. Mail. UPS *will not* deliver to a post office box or to another country.

MOST ISSUES STILL AVAILABLE

Issues July 1981 through June 1982 are available on white paper in a reprint form. All others are in regular magazine form. VISA, MasterCard and American Express accepted. Kentucky residents please add 5 percent state sales tax. In order to hold down costs, we do not bill, and no C.O.D. orders are accepted.

Due to heavy demand, we suggest you order the back issues you want now while supplies last.

To check availability and order, review and fill out the form on the next page and mail it with your payment to:

THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

BACK ISSUE ORDER FORM

(See overleaf for instructions.)

Please send me the following back issues:

MONTH/YEAR		PRICE	
	VOLUME 1		
JUL '81	Premier Issue	$2.00	☐
AUG '81		$2.00	☐
SEP '81	Education	$2.00	☐
OCT '81	Printer	$2.00	☐
NOV '81		$2.00	☐
DEC '81	Holiday	$2.00	☐
JAN '82		$2.00	☐
FEB '82		$2.00	☐
MAR '82		$2.50	☐
APR '82		$2.50	☐
JUN '82		$2.50	☐
	VOLUME 2		
JUN '83	Printers	$2.95	☐
JUL '83	Anniversary	$2.95	☐
	VOLUME 3		
AUG '83	Games	$2.95	☐
SEP '83	Education	$2.95	☐
OCT '83	Graphics	$3.95	☐
DEC '83	Holiday	$3.95	☐
MAR '84	Business	$3.95	☐
APR '84	Gaming	$3.95	☐
MAY '84	Printer	$3.95	☐
JUN '84	Music	$3.95	☐
JUL '84	Anniversary	$3.95	☐
	VOLUME 4		
AUG '84	Games	$3.95	☐
SEP '84	Education	$3.95	☐
OCT '84	Graphics	$3.95	☐
NOV '84	Data Comm.	$3.95	☐
DEC '84	Holiday	$3.95	☐
JAN '85	Beginners	$3.95	☐
FEB '85	Utilities	$3.95	☐
MAR '85	Business	$3.95	☐
APR '85	Simulations	$3.95	☐
MAY '85	Printer	$3.95	☐
JUN '85	Music	$3.95	☐
JUL '85	Anniversary	$3.95	☐

MONTH/YEAR		PRICE	
	VOLUME 5		
AUG '85	Games	$3.95	☐
SEP '85	Education	$3.95	☐
OCT '85	Graphics	$3.95	☐
NOV '85	Data Comm.	$3.95	☐
JAN '86	Beginners	$3.95	☐
FEB '86	Utilities	$3.95	☐
MAR '86	Business	$3.95	☐
APR '86	Home Help	$3.95	☐
MAY '86	Printer	$3.95	☐
JUN '86	Music	$3.95	☐
JUL '86	Anniversary	$3.95	☐
	VOLUME 6		
AUG '86	Games	$3.95	☐
SEP '86	Education	$3.95	☐
OCT '86	Graphics	$3.95	☐
NOV '86	Data Comm.	$3.95	☐
DEC '86	Holiday	$3.95	☐
JAN '87	Beginners	$3.95	☐
FEB '87	Utilities	$3.95	☐
MAR '87	Business	$3.95	☐
APR '87	Home Help	$3.95	☐
MAY '87	Printer	$3.95	☐
JUN '87	Music	$3.95	☐
JUL '87	Anniversary	$3.95	☐
	VOLUME 7		
AUG '87	Games	$3.95	☐
SEP '87	Education	$3.95	☐
OCT '87	Graphics	$3.95	☐
NOV '87	Data Comm.	$3.95	☐
DEC '87	Holiday	$3.95	☐
JAN '88	Beginners	$3.95	☐
FEB '88	Utilities	$3.95	☐
MAR '88	Business	$3.95	☐
APR '88	Home Help	$3.95	☐
MAY '88	Printer	$3.95	☐
JUN '88	Music	$3.95	☐
JUL '88	Anniversary	$3.95	☐
	VOLUME 8		
AUG '88	Games	$3.95	☐
SEP '88	Education	$3.95	☐
OCT '88	Graphics	$3.95	☐

RAINBOW INDEX A complete index to the first three years, July 1981 through June 1984, is printed in the July 1984 issue. Separate copies are available for $2.50 ☐

The Fourth, Fifth and Sixth Year Indexes including RAINBOW ON TAPE are printed in the July 1985, 1986 and 1987 issues, respectively. The Seventh Year Index is printed in the July 1988 issue.

TOTAL ____________

KY RESIDENTS ADD 5% ____________

U.S. MAIL CHARGE ____________
SHIPPING & HANDLING
U.P.S. CHARGE ____________
TOTAL AMOUNT ENCLOSED ____________

Article Reprints

In instances where a given issue is now out of print and not available for purchase, we do provide photocopies of specific articles. The cost for this service is $1.50 plus 50 cents S/H per article. This service is provided *only* in the case of out-of-stock issues.

Name ____________
Address ____________
City ____________ State ______ ZIP ____________
☐ Payment Enclosed, or
Charge to my: ☐ VISA ☐ MC ☐ AE
CARD # ____________
EXPIRATION DATE ________ PHONE (   ) ____________
SIGNATURE ____________

TO ORDER BY PHONE (credit card orders only) call (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492.

```
485 DATA"BR60BD50R8E4U10R4U6L4U6
H4L16G4D6L4D6R4D10F4R8BU10NG4NF4
BU4NLNR2BU6BL4NR2BR6R2BU10R6M-10
,-20M-10,+20BD48BL36U6NR10U4R10B
R6ND10R10D10NL10BR6U10R10D10NL10
BR6NU10R8BR6NU10BR6R10U6L10U4R10
BR6D10U6R10U4D10"
490 DATA FOOLISH
495 DATA"BRBD26BR24R76M-30,-10L4
G4L4H4L4M-30,+10D2M+30,+6R4E2R8F
2R4M+30,-6BD40BL80U10R10D4NL10BR
6D6U10R10D4L10R4F6BR6NR10U6NR10U
4R10BR6R4ND10R4BR6R4ND10R4BR6F4N
E4D6"
500 DATA PRETTY
505 DATA"BD22BR20NE4NG4R76NH4NF4
G12L52H12F6R10NU6ND6R10NU6ND6R2N
U6R2NU6R2NU6R2NU6ND6R10NU6ND6R2N
D6R2ND6R2ND6R2ND6NU6R10NU6ND6R6B
D40BL56NU10R10NU10BR6NR10U10R10B
D4NL4D6BR6NU10R8BR10U6NE4NH4"
510 DATA UGLY
515 DATA"BR16BD20R80M-4,+20L36M-
4,-18NL36E4R36H2L32R12U4R8D4BD42
BL56NR8D10R8BR6U10R8D10NL8BR12M-
6,-10BR12M-6,+10BR12NR8U6NR8U4R8
BR6ND10R10D4L10R4F6"
520 DATA COVER
525 DATA"BR16BD20R80M-4,+20L36M-
4,-18NL36BU8BE4R36H2L32R12U4R8D4
BD60BL70NU10R10NU10BR6U10F10U10B
R6NR8D10R8BR6U10R8D10NL8BR12M-6,
-10BR12M-6,+10BR12NR8U6NR8U4R8BR
6ND10R10D4L10R4F6"
530 DATA UNCOVER
535 DATA"BD2BR56F12D4G2L4D2F2D2M
-16,+4M+12,+3F2D2G4D4G2L14G2D4BE
20BR12NR26BD4M+20,+6BU20M-20,+6B
H18L4F2BD46BL22R6ND10R6BR6ND10R1
0D4NL10D6BR6NU10R8BR6U10D4R4NE4F
6"
540 DATA TALK
545 DATABD18BR94U4H4L4NU8L8G4D2G
2D12F2DF8R4ND6R6E4BH6L4H2U4BL28B
D20E2R2E2U4E2U20H2U4H2L2H2BL12BD
34E2R2E2U4E2U10H2U4H2L2H2BL12BD2
8E2R2E2U4E2U4H2U4H2L2H2BL12BD4NF
6D14L6F2L2BD26BR4D10R8BR6NU10BR8
R10U6L10U4R10BR6R6ND10R6BR6NR10D
4NR10D6R10BR6U10F10U10
550 DATA LISTEN
555 DATA"BR30BD8NE4NU8NH4BL8D10N
R60D20NR60D10R60BR6F4H2G2E4BR6U2
0NL60U20L60BD60BL14R10U6L10U4R10
BR6R6ND10R6BR6ND10R10D4NL10D6BR6
U10R10D4L10R4F6BR12U10L6R12"
560 DATA START
565 DATA"BR20BD8D10NR60D20NR60D1
0R60BR6F4H2G2E4BR6U20NL60U20NL60
D40BR6NE4NR8NF4BD20BL82U6NR10U4R
10BR8D10BR8U10F10U10BR8D10BR8R10
```

```
U6L10U4R10BR6D10U6R10U4D10"
570 DATA FINISH
575 DATA"BR44BD4R6F4R2E4R2F4R2E4
R6G8L20NH8D4R20NU4F12D14G6L30H6U
14E12BF6BD4NR8L4D6R12D6L12R6ND4N
U16BD30BL26U10R10D4L10R4F6BR8NU1
0BR8NR10U10R10BR6D10U6R10U4D10"
580 DATA RICH
585 DATA"BR58BD6R6F2R2F2R2F4R2F4
D4F2D6G2D4G4L2G4L2G2L2G2L12H2L2H
2L2H4L2H4U4H2U6E2U4E4R2E4R2E2R2E
2R4BD12BL2NG4D16L4R8BR8BU4U4R2L6
U4R6L2U4BD50BL36U10R10D4NL10BR6D
6U10R10D10NL10BR6U10R10D10NL10BR
6U10R10D4L10R4F6"
590 DATA POOR
595 DATA"BR36BD20R50D30L50U30BF6
ND16BR4ND16BR4ND16BR4ND16BR4ND16
BR4ND16BR4D16BD4NL24BR8BU4R4U2L4
U2R4BU6L4U2R4U2L4BR32BU18M-14,+6
BL12NE8BL10NE8BL10NU8BL10NH8BL12
NH8BL12M-14,-6BD58BR14U10F10U10B
R6ND10R10D10NL10BR8NU10BR8R10U6L
10U4R10BR6F4NE4D6"
600 DATA NOISY
605 DATA"BD2BR36F12D4G2L4D2F2D2G
4NL10F2D2G4D4G2L14G2D4BR28U24E4R
2F4D10E2R2F2E2R2F2E2R2F2D10G4BU2
0BL8R6U4L6U4R6BR6D8U4R8U4D8BR6U8
D4R8U4D8BR4R2BR4R2BL84BD38U10R10
D10NL10NF2NH4BR6NU10R10NU10BR8NU
10BR8NR10U6NR10U4R10BR6R6ND10R6B
L64BU48L6"
610 DATA QUIET
615 DATA"BR40BD2R44F4D2M-8,+20G8
L4D4F4NL20D6L20U6E4U4L4H8M-8,-20
U2E4BD4BR2G2M+6,+16R2U18NL4BR28D
18R2M+6,-16H2L4BL22BD4NG2D16NL2R
2BR2BU6R4U4L4U4R4BR4R2ND8R2BD56B
L32NU10R8NU8R8NU10BR8NU10BR8U10F
10U10"
620 DATA WIN
625 DATA"BR34BD16R6U4L6U4R6BR4NR
6D8R6BR4U8R6D8NL6BR4U8R6D4L6R2F4
BR4NR6U4NR6U4R6BD20BL50D10R10U10
NL10BR6BD4R6BR10BD6R4NR4U10NG4BR
10D10R10U10L10BF18L74U44R74D44BD
22BL64NU10R8BR6U10R10D10NL10BR6R
10U6L10U4R10BR6NR10D4NR10D6R10"
630 DATA LOSE
635 DATA"BR62BD36R8E4U10R4U6L4U6
H4L16G4D6L4D6R4D10F4R8BU10NG4NF4
BU4NLNR2BU6BL4NR2BR6R2BD10BF8M-1
2,+18M-12,-18BU24BR38D30R4U30L4U
6R12D2R8F6D4L4H4L6U2L10BL50BD8L2
2D2NR22R2D4F6G6D4L2NR22D2R22U2L2
U4H6E6U4BD48U10R10D10NL10BR6NU10
R8BR6R2NR10U10L2R12D10"
640 DATA OLD
645 DATA"BR60BD44R8E4U8R4U6L4U6H
4L16G4D6L4D6R4D8F4R8BU6NE4NH4BU8
NLNR2BU6BL4NR2BR6R2BU8U2H2L4BR26
BD6R10D20L10U20E2R6L2U2L2BL58BD4
L2G2D4F2R2D10G2D2F2E2U2H2U10R2E2
U4H2L2BD40BL6F4ND6E4BR6D10R10U10
NL10BR6D10R10NU10BR6U10F10NU10BR
6NR10U10R10BD4NL4D6"
650 DATA YOUNG
655 DATA"BR18BD4R60D46L60U46BF2R
10NF4R18ND4R18NG4R10D5NG4D16NL6D
16NH4D5L10NH4L18NU6L18NE4L10U5NE
4U16NR6U16NF4U5BD23BR28F8U2H8NU2
U12BR40ND8R12D4NL12D4BD8ND8G6H6D
8BD28BL60NR8U6NR8U4R8BR6ND10R10D
4NL10D6BR6U10R8D4L8R2F6BR6NU10R8
BR10U6NE4NH4"
660 DATA EARLY
665 DATA"BR18BD4R60D46L60U46BF2R
10NF4R18ND4R18NG4R10D5NG4D16NL6D
16NH4D5L10NH4L18NU6L18NE4L10U5NE
4U16NR6U16NF4U5BD23BR28H8U2F8NU2
U12BR40ND8R12D4NL12BD4BD8ND8G6H6
D8BD28BL56NU10R8BR6U10R10D4NL10D
6BR12U10L6R12BR6NR10D4NR10D6R10"
670 DATA LATE
675 DATABR12BD40R100L14BU2E2NR6U
2H2L2G2D2NF2L14NG2U2H2L2G2D2NF2L
10U4R4U2E6R20F4R10D8NR2BL54L4NG2
U2H2L2G2D2NF2L14NG2U2H2L2G2D2NF2
L10U20R28D6R6D6R8ND8BE22D8NE4NH4
BL60BD42D10BR6U10F10NU10BR12U6NR
8U4R8BR6ND10R8D4L6F6BR6U10R8D10N
L8BR6U10F10U10BR6R8L4D10
680 DATA IN FRONT OF
685 DATABR12BD40R98L8BU4NG2U2H2L
2G2D2NF2L14NG2U2H2L2G2D2NF2L10U2
0R28D6R6D6R8D8L4BL56BD2E2NR6U2H2
L2G2D2NF2L14NG2U2H2L2G2D2NF2L10U
4R4U2E6R20F4R10D8NR2BH22NU8NH4NE
4BD52BL14NU10R8U6NL8U4NL8BR6NR8D
4NR8D6R8BR6U10D4R8U4D10BR8U10BR8
ND10F10U10BR6R8D10L8R2U8
690 DATA BEHIND
695 DATA"BR12BD40R100L64BU2E2NR6
U2H2L2G2D2NF2L14NG2U2H2L2G2D2NF2
L10U4R4U2E6R20F4R10D8R2BD4R8U24N
G4U4NR44L8E12NR40BG16BL12NL14NH4
NG4BD42BL20NR10D4NR10D6R10BR6U10
F10U10BR6R6ND10R6BR6NR10D4NR10D6
R10BR6U10R10D4L10R4F6"
700 DATA ENTER
705 DATA"BR12BD40R100L14BU2E2NR6
U2H2L2G2D2NF2L14NG2U2H2L2G2D2NF2
L10U4R4U2E6R20F4R10D8NR2BD4L52U2
4NF4U4NL44R8H12NL40BF16BR12R14NH
4NG4BD42BL60NR10D4NR10D6R10BR6E6
NH4NE4F6BR8U10BR8R6ND10R6"
710 DATA EXIT
715 DATA"BR30BD24ND10F10M+28,-8R
10F10G4NL10G6L10M-28,-8G10U10U2B
```

```
R36NH4NG4BR10BU4R2BR12R2BU6R2BU6
R2BU6R2BU10BR4NF4G4L8H4G4L8H4G4L
8H4G4L8H4G4L8H4G4BD60BR10U10R10D
4NL10D6BR6NU10R8BR8U10BR6D4F6E6U
4BR6NR10D4NR10D6R10"
720 DATA ALIVE
725 DATA"BR30BD24ND20F10NG10R6NU
4ND4R6NU6ND6R6NU8ND8R6NU8ND8R6NU
8ND8R6ND8U8R4F8G4NL4G4L4BD26BL46
NL2U10L2R12D10NL10BR6NR10U6NR10U
4R10BR6ND10R10D4NL10D6BR6R2NU10R
10U10L12BU38BL10E2U2H2U2E2U2H2U2
BL12D2F2D2G2D2F2D2G2"
730 DATA DEAD
735 DATA"BR34BD34NU8R6NU8R6NU8BR
6U8R8D4NL8D4BR6NU8R8BR6U8D4R4NE4
F4BR6ND4U12L68D16NR68U18R68U2L68
U2R68U2L68U2R68U2L68U2R68U2NL68L
28NU6L10NU6BD32ND6BR10ND6BD20BL1
8ND10R10BD4NL4D6NL10BR6U10R10D10
L10"
740 DATA GO
745 DATA"BR34BD34NU8R6NU8R6NU8BR
6U8R8D4NL8D4BR6NU8R8BR6U8D4R4NE4
F4BR6ND4U12L68D16NR68U32R68ND32L
28NU6L10NU6BD32ND6BR10ND6BU20BL3
4R2NU8R8U8NL10BR6ND8R8D8NL8BR6U8
F8U8BR6R2ND2BR4R4ND8R4BD58BL60R1
0U6L10U4R10BR6R6ND10R6BR6ND10R10
D10NL10BR6U10R10D4L10"
750 DATA STOP
755 DATA"BR22BD16NR68M+4,+10F16G
6R40H6E16M+4,-10BD10BR6R10F4D6G1
0M-10,+3L10E6R10E6U2H2L4U4BU10BL
30G6D4NF4G8BD32BL36R2NU10R10U6NL
10U4NL12BR6ND10R10D4L10R4F6BR6U1
0R10D10NL10BR6NU10U6R4NE4F6BR6NR
10U6NR10U4R10BR6ND10F10U10"
760 DATA BROKEN
765 DATA"BR22BD16NR68M+4,+10F16G
6R40H6E16M+4,-10R10F4D6G10M-10,+
3L10E6R10E6U2H2L4BD46BL66U6NR10U
4R10BR8D10BR8E6NH4NE4F6BR6NR10U6
NR10U4R10BR6R2ND10R10D10NL12"
770 DATA FIXED
775 DATA"BR30BD42R50E4U6M-6,-16E
2U4H4L12G2D6F2R4NE2D10H2L2H2L4H2
L6G2L4G2L2G2L4BU10R12U2L12U2R12N
R16U2NR16L12U2R12U2L12BR60R12D2L
12D2NL16R12D2L12NL16D2R12D2L12BD
52BL74R8U6L8U4R8BR6R4ND10R4BR6ND
10R8D4L8R2F6BR8U10R8D10NL8BR6U10
F10U10BR6NR8D10R8U6L2"
780 DATA STRONG
785 DATA"BR30BD42R12D2R10D2R6U2R
10U2R12E4U6M-6,-16E2U4H4L12G2D6F
2R4NE2D12L34BU16NR26NU4ND2U2R26B
R22R22NU2ND4D2L22BD56BL52NU10R6N
U8R6NU10BR6NR10U6NR10U4R10BR6ND1
0R10D4NL10D6BR6NU10U6R4NE4F6"
790 DATA WEAK
```

```
795 CLS:V=1
800 FORI=1TO20
805 AO(I)=RND(20)
810 IF N(AO(I))=1 THEN 805
815 N(AO(I))=1:NEXTI
820 FOR P=1TO20
825 CLS
830 PRINT@68,"WHAT IS THE OPPOSI
TE OF"
835 PRINT@132,C$(AO(P))+" ?"
840 FOR Q=1TO2
845 C(Q)=RND(20):IF C(Q)=AO(P) T
HEN845
850 FOR K=Q-1 TO 0STEP-1:IF C(K)
=C(Q) THEN845
855 NEXTK
860 NEXTQ:C(3)=AO(P)
865 FOR E=1TO3
870 F(E)=RND(3)
875 FOR K=E-1 TO 0 STEP-1:IF F(K
)=F(E) THEN870
880 NEXTK:NEXTE
885 PRINT
890 PRINTTAB(8)"1-"+B$(C(F(1))):
PRINT
895 PRINTTAB(8)"2-"+B$(C(F(2))):
PRINT
900 PRINTTAB(8)"3-"+B$(C(F(3))):
PRINT
905 G$=INKEY$:IFG$="@"THEN965
910 IF G$=""THEN905
915 G=VAL(G$)
920 IF G<1 THEN 905
925 IF G>5 THEN 905
930 IF C(F(G))<>AO(P) THEN945
935 PRINT:PRINT" RIGHT! THE ANS
WER IS: "+B$(AO(P))
940 NC=NC+1:GOTO955
945 PRINT:PRINT"  SORRY! THE AN
SWER IS: "+B$(AO(P))
950 NW=NW+1
955 X$=INKEY$:IFX$<>CHR$(13)THEN
955
960 NEXT P
965 CLS:PRINT@101,"YOU TRIED"NC+
NW"TIMES &":PRINT@165,"ANSWERED"
NC"CORRECTLY"
970 PRINT@229,"WHILE DOING"NW"WR
ONG."
975 NQ=NC+NW:IF NQ=0THEN NQ=1
980 MS=INT(NC/NQ*100)
985 PRINT@293,"YOUR SCORE IS"MS"
%."
990 PRINT@357,"ANOTHER TRY (Y/N/
C) ?";
995 X$=INKEY$:IFX$="Y"THEN RUN
1000 IFX$="N"THENCLS:END
1005 IFX$="C"THEN1015
1010 GOTO995
1015 IFV=1THEN825
1020 IFV=0THEN280
```

Sugar Software

☞ NEW! The OS9 Calligrapher Font Massager ☜

This OS9 utility program allows you to do all sorts of things to Calligrapher font files. You may create new fonts, modify existing fonts, invert fonts, compress fonts, double the height and/or width, halve the height and/or width and convert between OS9 and RSDOS formats. **$19.95** (or only **$14.95** if ordered with any other *Calligrapher* item).

CALLIGRAPHER

CoCo Calligrapher - (Hybrid BASIC/ML) Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, labels and more. Includes 3 fonts: *Gay Nineties, Old English* and *Cartoon*. The letters are ½ inch high and variably spaced. Works with many printers including Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter. Additional fonts are available (see below). Tape/Disk; **$24.95**.

OS9 Calligrapher - (C) Although a different program from the CoCo Calligrapher, the OS9 Calligrapher prints all the same fonts. It reads a standard text file which contains text and formatting directives. You may specify the font to use, change fonts at any time, centering, left, right or full justification, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX systems. Includes Gay Nineties, Old English and Cartoon fonts. Additional fonts are available (see below). Disk only; OS9 Level I or II; **$24.95**.

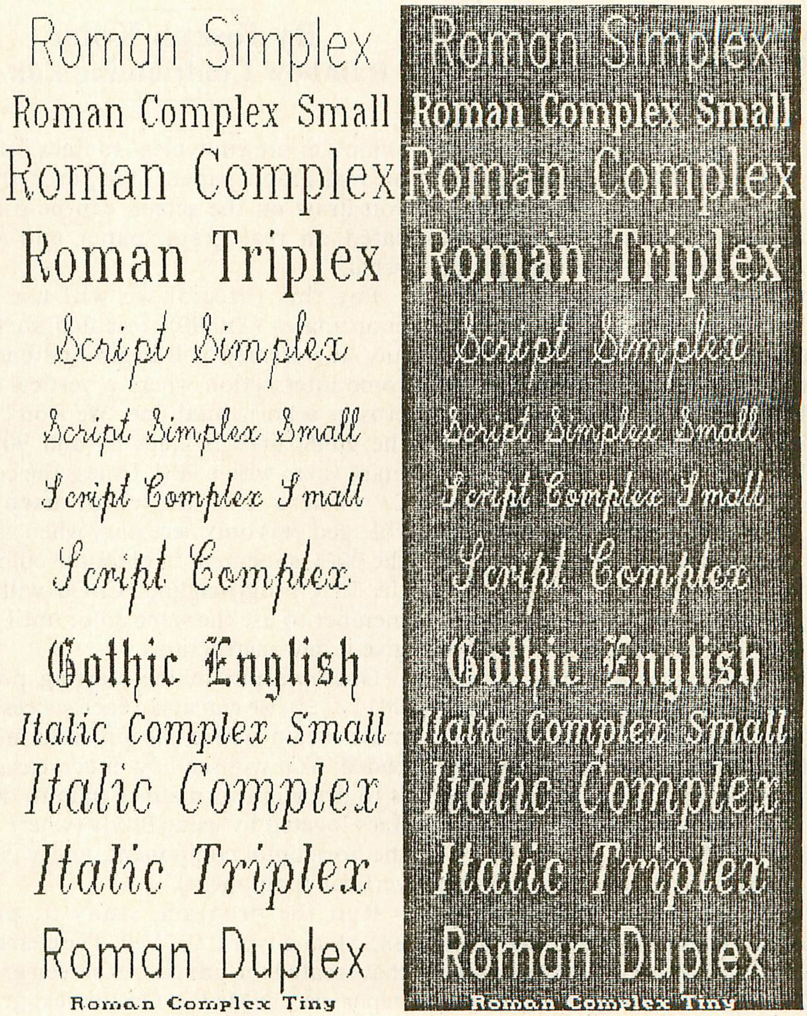
Calligrapher Fonts - Requires Calligrapher above. Each set on tape or disk; specify RSDOS or OS9 version; **$14.95** each. **Set #1** - (9 fonts) Reduced, reversed and reduced-reversed versions of Gay Nineties, Old English and Cartoon; **Set #2** - (8 fonts) Old Style and Broadway; **Set #3** - (8 fonts) Antique and Business; **Set #4** - (8 fonts) Wild West and Checkers; **Set #5** - (10 fonts) Stars, Hebrew and Victorian; **Set #6** - (8 fonts) Block and Computer; **Set #7** - (5 *small* fonts) Roman, Italics, Cubes, Digital and Old World.

Economy Font Packages on disk; specify RSDOS or OS9; **$29.95**: **Font Package #1** - Above font sets 1, 2 and 3 (25 fonts) on one disk. **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts) on one disk. Both Packages #1 and #2 (51 fonts) on one disk; **49.95**.

Calligrapher Combo Package - Includes the Calligrapher and Economy Font Packages #1 and #2, 54 fonts in all; specify RSDOS or OS9; **$69.95**.

NEW! Hershey Fonts Now Available For the Calligrapher!

These 28 fonts are known as the *Hershey* fonts developed by Dr. A. Hershey. All fonts come in both standard and reverse. **Set #10** includes Roman (Simplex, Complex Small, Complex, and Triplex) - 8 fonts. **Set #11** includes Script (Simplex Small, Simplex, Complex Small and Complex) and Gothic English - 10 fonts. **Set #12** includes Italic (Complex Small, Complex and Triplex), and Roman (Duplex and Complex Tiny) - 10 fonts. Each set is **$14.95**. Sets 10, 11 and 12 on one disk make up the **Economy Font Package #4**, (28 fonts) for **$29.95**. *See special offer above.*



For a complete catalog of Sugar Software products and fonts, send a stamp and a label.

RAINBOW CERTIFICATION SEAL

MasterCard

VISA

*TRS-80 is a trademark of Tandy Corp.

SUGAR SOFTWARE
P.O. Box 7446
Hollywood, Florida 33081
(305) 981-1241

All programs run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for shipping and handling. Florida residents add 6% sales tax. COD orders add $5. Dealer inquiries invited. Orders generally shipped in 24-48 hours. No refunds or exchanges without prior authorization.

Modify last month's program to smooth out your art work

New Directions

By Joseph Kolar
Rainbow Contributing Editor

Last month, we studied the eight directional motion `DRAW` commands and developed a design on our graph paper screen. That is not the end of CoCo's abilities, however. CoCo can use other directions. `CLOAD` and run the *Graphic Paper* program you saved onto tape. If your program doesn't have a holding line, type `300 GOTO 300`. (Note: When using these new direction commands, first plot the drawing on graph paper.)

Look at Listing 1, but don't copy and run it. You will only get junk. Follow the instructions found in this article and have fun learning this new concept.

Using `LHUERFDG` motion commands you created angular drawings. The results of these artistic efforts, even in `PMODE 4`, have jagged outlines. You see the telltale step syndrome. To mute these angular forms and give them the semblance of gentle curves, use the `M` motion command. Use real graph paper to draw the lines as they are explained.

We will now make some changes in last month's *Graph Paper* program. Key in `97 PSET(110,90,3)` and run. This is the point of origin, around which we shall build a design. Both horizontal and vertical lines are in increments of 10 (i.e., 0,10,20, to 240). Dark guide lines are in increments of 40 (i.e., 0,40,80, etc.). The dark lines are an overlay to help locate specific points. They are created in lines 80 and 90. You may use them or remove them by inserting a `REM` in front of the lines.

Look at the graph on the computer screen. Starting at the left margin, we have three white lines and then a dark line. Along the horizontal line that displays the dot, count the first dark line as 40, the next dark line as 40, and the three white lines between (each having a value of 10) as a total of 30. Together the lines total 110.

Count down from the top border, along the vertical line on which the dot is displayed. There are two dark lines with one white line between (90 total).

Delete Line 97 and key in Line 100. Use `S40` to make the lines created by the `UDLREFGH DRAW` command 10 times as large as they appear in the default mode. This way the lines drawn with the computer are equivalent to lines drawn on real graph paper. Thus, everything you draw on the screen can be duplicated on real graph paper and vice versa.

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

For this tutorial we will use the coordinates (110,90), oriented so that any line created will begin and end at some intersection where a vertical line crosses a horizontal one. We won't use the guide lines in lines 80 and 90, so mask them with a `REM`. Unless the color `C`*x* (where *x* is the color used) is changed, it is only necessary when using the `DRAW` statement to enter the color in the first program line. CoCo will remember to use the same color until you give it new instructions.

Once we put in the starting point, `BM110,90`, we can make each successive move begin where the previous move ended. You will see how much easier it is to draw in this manner than to draw lines located by using `BM`*x,y* (where *x* is the horizontal component, and *y* is the vertical component).

Run the program, study it, press BREAK and type `LIST100`. The elements that created the line on our screen graph paper were NM+1,2. On the real graph paper, put a heavy dot at an intersection. N tells CoCo that after it moves M+1,2 it must return to its original position (back to the dot). M+1 tells CoCo to move one space in a positive direction — from the starting point of the move, to the right. On your graph paper, draw a line from the dot to the first horizontal/vertical intersection on the right. M+1 is followed by ,2. The 2 or +2 tells CoCo to move down two spaces in the positive vertical direction. Now draw a perpendicular line that starts at the end of the last pencil line and ends at the second horizontal/vertical intersection. Put a heavy dot at the end.

CoCo will draw a line between the two dots, M+1,2 or M+1,+2. The N made the cursor return to its starting point.

To see the lines on the screen, type `EDIT100` and press ENTER and X to end. Press the left arrow once to remove the closing quotation mark, type `RD2` and enter. Type `RUN`, and press BREAK. To edit Line 100, use the spacebar to move under the R. Press `3D` to remove `RD2`. Press ENTER and run.

Look at Line 101 in the listing (`DRAW "NM+1,-2"`). On real graph paper, draw a line in a positive direction (R) from the dot at (110,90). In the program, a comma separates the vertical and horizontal directions. The vertical element is -2 (i.e., it moves up two from the end of the horizontal line just drawn). Draw the line (U2) and make a dot. CoCo will use NM+1,-2 to connect the dots and return. Key in Line 101 and run.

There are two components to these new moves. The first (horizontal) is separated by a comma from the second (vertical) component: Mh,v. If this move is prefixed by an N (NMh,v), the cursor will return to its original position after the move is completed. If the command is prefixed by a B (BMh,v), an invisible line will be drawn. In effect, it is a jump move to a new location.

If the movement of the horizontal is negative, it moves to the left of the starting point. If it is a positive value, the movement is to the right. If the movement of the vertical component is negative, the cursor moves up from the starting point; if it is a positive value, it moves down.

The formula is as follows:

M(+ or -)h,(+ or -)v
M = movement
+h = right
-h = left
, = separates elements
+v = down
-v = up

Key in and list Line 102 (`DRAW "NM-1,-2"`). We have returned to (110,90). On real graph paper, we will move M-

Making the COMPUTER CENTER **MicroWorld** *of Computers*

Affordable.....

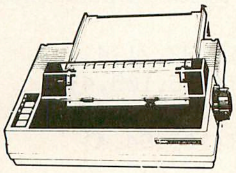
MicroWorld II
PO Box 5330
Clinton, NJ 08891

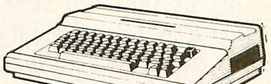
Since 1982

MicroWorld
PO Box 69
Wind Gap, Pa. 18091

Since 1982

CALL: In Pa: (215) 863-8911
In NJ: (201) 735-6138





Free Shipping* | 100% TANDY Products*

CoCo

CoCo III, 128K	$145.00
CM-8	$248.00
Magnavox-8CM515 w/cbl	$317.00
FD-502 Drive 0, CoCo	**$225.00**
DMP-106	**$165.00**
DMP-132	$275.00
SEIKOSHA SP1000 100cps Same as DMP-130	$159.00
SEIKOSHA SP1200 120cps Same as DMP-130A/132	$199.00
Star Micronics NX15	**$399.00**
Star Micronics NX1000	**$199.00**
CCr-81	$43.00
Joysticks (Pair)	$13.00
Color Mouse	$33.00
Deluxe Color Mouse	**$38.00**
Joystick - DELUXE	**$24.00**
Serial Cables	$3.25
Hi-Res Joystick Interf.	**$8.00**

CoCo Upgrades

CoCo III, 512K UPGRADE	$145.00
Multi-pak upgrade OLD	**$12.00**
Multi-pak upgrade NEW	$12.00

COMPUTERS

TANDY 1000 HX Computer	$535.00
TANDY 1000 TX Computer	$860.00
TANDY 1400 LT	$1295.00
TANDY 3000	**$1475.00**
TANDY 3000 HL	$1090.00
TANDY 4000	$1890.00

MONITORS

VM-4 Monochrome Monitor	$95.00
CM-5 RGB Color Monitor	**$220.00**
CM-11 RGB Color Monitor	**$310.00**
EGM-1 color Monitor	$525.00
CM-8	$248.00
Magnavox - 8 CM 515	$298.00

HARD CARDS

TANDY 20 Meg Hd Card	$439.00
30 Meg ZUCKER	$499.00

HARD DISKS

(Kits include cable & controller)

Seagate 20 Mg Kit	$299.00
Seagate 30 Mg Kit	**$349.00**
Seagate 40 Mg Kit(no controller)	$399.00

FLOPPY DRIVES

TEAC Internal:

TEAC 5 1/4 Disk-360kb	$99.00
TEAC 3 1/2 Disk-720kb	$119.00

FLOPPY DRIVES

Radio Shack:

External:

5 1/4 Ext. Drive-HX/EX	$180.00
3 1/2 Ext. Drive-HX/EX	$199.00

Internal:

5 1/4 Disk-360kb	**$125.00**
3 1/2 Disk-720kb	$125.00
3 1/2 to 5 1/4 Adapter	$24.00
5 1/4 1.2M FDD Kit	$215.00
5 1/4 360K FDD Kit	$140.00

PRINTERS

DMP-106 (Special)	$175.00
DMP-132	$275.00
DMP 440	$545.00
DWP-520	$719.00
DMP 2120	$1279.00
LP1000 Laser	$1899.00
SEIKOSHA SP1000 (DMP-130)	$159.00
SEIKOSHA SP1200 (DMP-132)	$199.00
Star Micronics NX15	$399.00
Star Micronics **NX1000**	$199.00

BOARDS

Smart Watch	$30.00
Plus Upgrade Adapter Bd	$12.50
Memory Plus Expansion BD	**$110.00**
EGA Adapter	**$185.00**

MODEMS

1200 Baud Pc Modem	$159.00
Plus 300 Baud Pc Modem	$75.00
Plus 1200 Baud PC Modem	$150.00

MISC

Serial Mouse	**$36.00**
Joystick - DELUXE	**$24.00**
Monitor Platform	$24.00
Ribbons - DMP-130	$8.00
Ribbons - DMP-105/106	$5.50
Flips - R/S	**$11.00**
Disk Clean Kits	**$5.00**
Cover - DMP-105/6	$3.00
Cover - CoCo II/III	$3.00
Cover - DMP-130	$3.00
Bulk Erasers	**$12.00**
Flip n' Files w/lock (3-1/2 or 5-1/4)	**$11.00**
Library Case-Black	$1.50
Library Case-Tan	$2.00
Paper- Mini 20#	$4.00
Paper #15	**$14.00**
Paper #20	**$10.00**

DISKS

Tandy SS 5 1/4 Disks	$9.00
Tandy DS 5 1/4 Disks	$10.00
Tandy DS 3 1/2 Disks	$28.00
Winners DS/DD W/Lib case	**$7.50**
Winners SS/DD W/Lib case	**$7.00**

Minimum:

15% off Radio Shack Hardware

20% off Radio Shack Software

* 100% TANDY Warranty on TANDY products - Manufacturer's Warranty applies on all other items.
* FREE UPS shipping on orders over $50 (In the Continental US) - under $50 add $5 for shipping.
* The **above** prices are CASH prices - add 3% for credit cards. No **COD's** will be taken. Prices may be slightly higher in our retail stores.
* All returns must have prior authorization and are subject to a re-stocking fee.

1, which moves us one unit to the left. Draw in the line and end with a heavy dot. The *vertical* component is -2, which is two units up. Continue the line you began, moving up two spaces. End with a heavy dot. Connect the two dots. CoCo will draw this line when you run the program.

Next look at Line 103. We move one unit to the left because the first element is -1. Draw the appropriate line. The comma tells us that the next component, 2 or +2, is the vertical element. Draw a line down two units and make a dot. Draw a line between the two dots. CoCo will draw this line and return to its point of origin.

Key in Line 103 and run. You should now have an X on your screen. (To show you the importance of those N prefixes, delete them from lines 100-103. Can you guess what your drawing will look like? Try it! Replace all the N's and let's continue.)

Key in and list Line 110. We keep returning to our original position (110,90) so that our design will emanate from a single point. We are now going to make a two-unit-long X, using the directions, EFGH. Run the program. Now we will make another X that emanates from (110,90) and goes to the following points in succession: (130,100), (130,80), (90,80) and (90,100).

Get out your graph paper. Put a dot at some intersection and label it (110,90). Find the four points listed above, and put a dot at each set of coordinates. Connect them one at a time to the central dot. Use this information to determine the NMh,v locations. Use NM so we can return to (110,90).

When you find the first location, check Line 111. Key in Line 111 and see how you have done. Do the same for the other coordinates and key in lines 112, 113 and 114. We now have a triple X. The temptation is to add the routine, `NL2NR2NU2ND2`, but we want to be more creative than that.

Key in Line 120. This tells CoCo to draw an invisible line (jump move) two units to the left and one unit up. (CoCo connects the beginning point with the end point.) Then it asks CoCo to make a conventional move, one unit up and, from there, one unit right.

Key in Line 121. BR2 caused the cursor to jump two spaces to the right, and then draw one space to the right of and one space down from the jump. Now work out the other arms of the design, lines 122 and 123. Use your graph paper to visualize what you are creating. After you key in those lines and run the program, you should have a symmetrical design. We are going to add one-unit lines to the four segments. Key in Line 130 and run.

There is always more than one way to do anything. The simplest way to make this design is to pick the central point (110,90) and proceed as we have already done (the old N ploy).

Your last move ended at (90,100). Pick out an intersection and mark a dot. I usually label the 90 to the left of and the 100 above the dot so I know where I am starting. Since each line is 10 units from the next, I know that to get from 90 to 110 on the horizontal, I must move to the right two units, or M+2. To get from 100 to 90 on the vertical, I must go up one unit, or -1. Run the program.

You will notice that you are able to print over an existing line. I chose to make it invisible with a jump move by prefixing my command with B.

Key in Line 131. Use your graph paper to draw this, so you can visualize the program as you read it. We are back at (110,90). Run the program. Next key in and run Line 140. We moved four units in each direction and made a square.

The last instruction of Line 140 is not NU4, which would return us to the center, but U4, which keeps us in a corner. There is method to our madness. Lines 150 through 157 connect the eight spokes of our drawing in a clockwise direction. Work out the movement statements one at a time using the formula we used earlier. If you look at the tips of the U and E spokes, you can count the three lines between them on the horizontal plane. They are to the right of the center, so they are positive (M+3). Add the comma to separate the components. Note that the E spoke is one unit down (+1). Thus, your direction would be M+3,1 or M+3,+1. Continue to calculate the formula for each section until you have completed the octagon. After you complete this, check with the listing to see if your calculations are the same as those in lines 150 through 157.

We will now edit Line 100 and center the design on CoCo's screen at (128,96). Move the cursor under the second 1 and press `2C` to tell CoCo that you want to change the next two characters. Press `28` and `SHIFT`-up arrow. Move the cursor under the 0 of 90, press C to tell CoCo that one letter will change, enter and run the program.

We now have a pie figure, and we will paint alternating pieces of this pie. Unmasking the guide lines (80 and 90) will help when locating the coordinates for the `PAINT` command. Any pair of coordinates in the green background area within the segment are satisfactory.

Look at the coordinates given in lines 170 through 173 of the listing. They are located somewhere in the background. Convert the `PAINT` lines to `PSET` lines if you want to see the point chosen:

```
170 PSET(132,71,4)
171 PSET(155,109,4)
172 PSET(116,125,4)
173 PSET(105,94,4)
```

Run the program.

When you plan to use the `PAINT` command, find a point within the boundaries to be painted. Then change the `PSET` line to a `PAINT` line in this manner: Change `PSET(116,125,4)` to `PAINT(116,125),4,`*x*, where *x* is the border color. See how easily you can make the big switch?

Key in lines 170 through 173. You don't have to delete the original lines; use them as a guide and key in the proper data. When you run the program, the guide lines (in Color 4) will block part of your `PAINT` command. Next, paint the right half of the four "propeller blades" (that is what they look like to me). Use `PSET` to find points within the boundaries of these blades, and convert the `PSET` command to a `PAINT` command. If you would prefer, key in lines 180 through 183 and run. (The program uses Color 1, so there is little difference.)

At this point we want to get rid of the *Graph Paper* program. It is sacrilege to delete it, so we will bypass it. Key in lines 6 and 99 without the `REM` and run. Now for the masterpiece: Mask lines 6 and 99, key in Line 15 without the `REM` and run.

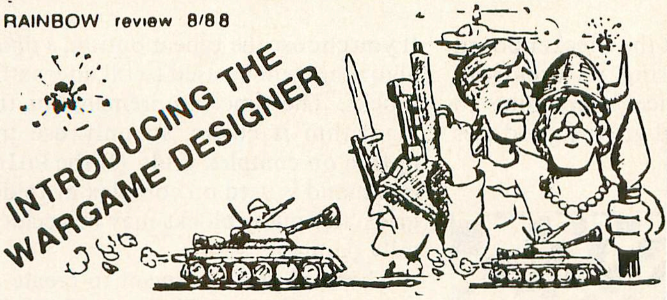
Want another masterpiece? Change the foreground from Color 4 to 3 in lines 170 through 173 and from Color 2 to 1 in lines 180 through 183. Unmask lines 6 and 99 and run. Who wants to practice? Gain more confidence in handling your new skill by changing all the fours in Line 140 to fives. Choose a starting point on one of the spokes and link up the eight spokes in lines 150 to 157. The modified program will be in next month's article.

This tutorial is not just a game; it has practical value. Have your utility program ready for the next lesson, and we will create more beautiful works next month. ☐

The listing:

```
0 'LISTING1
5 CLEAR500
6 'GOTO99
10 PMODE3,1:PCLS:SCREEN1,0
15 'GOTO100
20 A$="D10R240":B$="D10L240"
30 C$="R10D160":D$="R10U160"
40 E$=A$+B$+A$+B$:F$=C$+D$+C$+D$
50 DRAW"C2BM0,0D10R240D10L240D10
R240D10L240"+E$+E$+E$
60 DRAW"BM0,0R10D160R10U160R10D1
60R10U160"+F$+F$+F$+F$+F$
70 DRAW"C4BM0,0R240D160L240U160"
80 DRAW"C4BM0,40R240D40L240D40R2
40D40L240"
90 DRAW"BM40,0D160R40U160R40D160
R40U160R40D160"
99 'PMODE4,1:PCLS:SCREEN1,1
100 DRAW"S40C3BM128,96NM+1,2"
101 DRAW"NM+1,-2"
102 DRAW"NM-1,-2"
103 DRAW"NM-1,2"
110 DRAW"NE2NF2NG2NH2"
111 DRAW"NM+2,1"
112 DRAW"NM+2,-1"
113 DRAW"NM-2,-1"
114 DRAW"NM-2,1"
120 DRAW"BM-2,-1UR"
121 DRAW"BR2RD"
122 DRAW"BD2DL"
123 DRAW"BL2LU"
130 DRAW"BM+2,-1NH3"
131 DRAW"NE3NF3NG3"
140 DRAW"NL4ND4NR4U4"
150 DRAW"M+3,1"
151 DRAW"M+1,3"
152 DRAW"M-1,3"
153 DRAW"M-3,1"
154 DRAW"M-3,-1"
155 DRAW"M-1,-3"
156 DRAW"M+1,-3"
157 DRAW"M+3,-1"
170 PAINT(132,71),4,3
171 PAINT(155,109),4,3
172 PAINT(116,125),4,3
173 PAINT(105,94),4,3
180 PAINT(144,85),2,3
181 PAINT(144,114),2,3
182 PAINT(116,104),2,3
183 PAINT(115,78),2,3
300 GOTO300
```

RAINBOW review 8/88



TAKE COMMAND! Now you can create your own 1 & 2 player wargames and more. If you are into wargames, science fiction or Dungeons and dragons, you'll love the WGD system.

The completely menu driven system allows you to create your own full color Hi-res icons for units and map features. Take control of the number of units, strength, movement, turn of entry, range of fire, terrain modifiers and objectives. No programming required! WGD comes with a 23 page manual and 2 flippy diskettes in a rigid vinyl case with these four ready to play scenarios:

INVASION NORTH — a river crossing challenge
ATTACK ON MOSCOW — a historic simulation 1941
ROBOT COMMAND — a sci-fi thriller
DUNGEON WARRIOR — save the damsel in distress

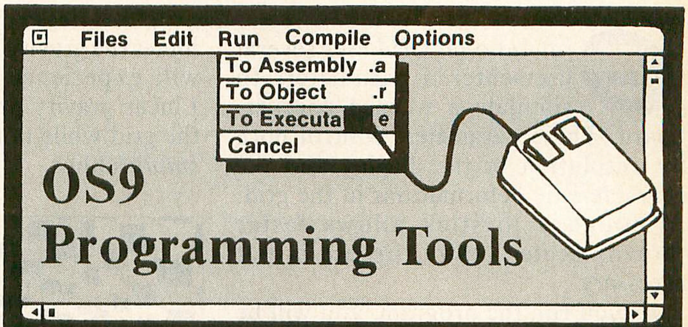
Complete WGD system ONLY $29.00 Each scenario available separately with WGD system demo for ONLY $10.00.
COCO 3 128K Disk

GRIDIRON STRATEGY

The FIRST and still the BEST 2 player football strategy game for the COCO 3 128K disk.
Over 20 offensive plays and 10 defensive allignments. See the RAINBOW review 8/87 ' fascinating.' Totally unique playing system!
Disk, manual and playing aids only $21.00

Orders shipped first class FREE within 24 hours of receipt ORDER TODAY!

SPORTSware 1251 S. Reynolds Rd., Suite 414, Toledo, OH 43615
(419) 389-1515



• CCENV® PROGRAMMING ENVIRONMENT

CCENV is a mouse-and-menu driver for all OS9 compilers and assemblers. CCENV is interactive and easy to use. A single mouse-click can take a C program from source code to executable module and then run the program in a window. Colorful pull-down menus, popup menus and dialog boxes set all compiler, assembler, and linker options. Temporary files are automatically written on the RAMdisk if available, reducing compile-time. Go from edit mode to compile and back to edit with mouse-clicks. Error messages are saved and can be scrolled in a window during your next editing session.

CCENV maintains configuration files so all options can be rechosen automatically. A PROJECT option implements the MAKE utility, allowing large projects to be split into separate modules until linking. Coupled with CCENV, any OS9 compiler becomes interactive and brisk. You can throw away "CC1." Move over, Turbo C! This is the way programming should be!

CCENV OS9 COMPILER/ASSEMBLER ENVIRONMENT $49.95
with source code $99.95
Requires OS9 Level II, mouse, and any compiler or assembler.
Preset for the MicroWare C Compiler.

• FUNCTION LIBRARIES

C GRAPHICS LIBRARY: The complete CGFX graphics library in C source code and relocatable modules $19.95
C MATH LIBRARY: $19.95
BASIC09 FORMAT .... $ 9.95 Both $24.95
BASIC09 MOUSE & MENU LIBRARY: Create mouse-driven applications with pulldown menus from BASIC09. Includes UNDERSTANDABLE directions for using mice and menus in OS9. $14.95

(please add $2.50 S/H) (509) 783-5132
* FoxWare 5101 W. 12th Kennewick, WA 99337 *

Create whirlpools and waves in an undulating grid

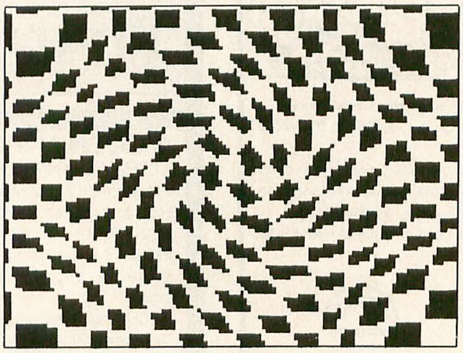
Warped Animation

By Patrick D. Grengs II

Gravitational Grid uses several user-entered parameters to simulate a warped checkerboard. These parameters control both the resolution of the display and the characteristic deformations in the grid. Although a joystick allows faster "gravity-center" entry, its use is not necessary.

As you run the program, you will be asked a number of questions. The first of these concerns screen resolution. If you want your display to be animated, press N at the prompt, "High Resolution (Y/N)." Since the animated display must create four consecutive screens, it will take about four times longer to generate an animated display than a high resolution display. The next prompt, "Enter X Linear Step," pertains to the width, in pixels, of each of the displayed checkers. Similarly, "Enter Y Linear Step" designates the height, in pixels, of each checker square.

The next prompt asks for the gravity type: Linear or Normal. This determines the gravity that the checker board will experience during its creation. Linear gravity produces *sharp* blips in the grid while normal gravity produces *smooth* blips.



"<1> Points <2> Grid <3> Checkers" asks for the type of grid to be created. While the Points option produces a grid composed of points where the vertices should be located, Grid creates the actual grid, with corresponding vertices connected by line segments. Checkers creates a grid with every other region filled in. If you choose the Checker option, you will be asked to enter a filling — paint or linear. If you choose the Paint option, every other block will be filled using CoCo's `PAINT` command. If you choose the Linear option, a *filling* algorithm will be used to fill alternating blocks. The time requirement for this algorithm is costly, so only use this option on complex grids. (If the `PAINT` command is used on complex or folded grids, too many blocks may be accidentally painted.

Those of you who want to create an animated display will also be asked for the horizontal and vertical direction of movement on the grid.

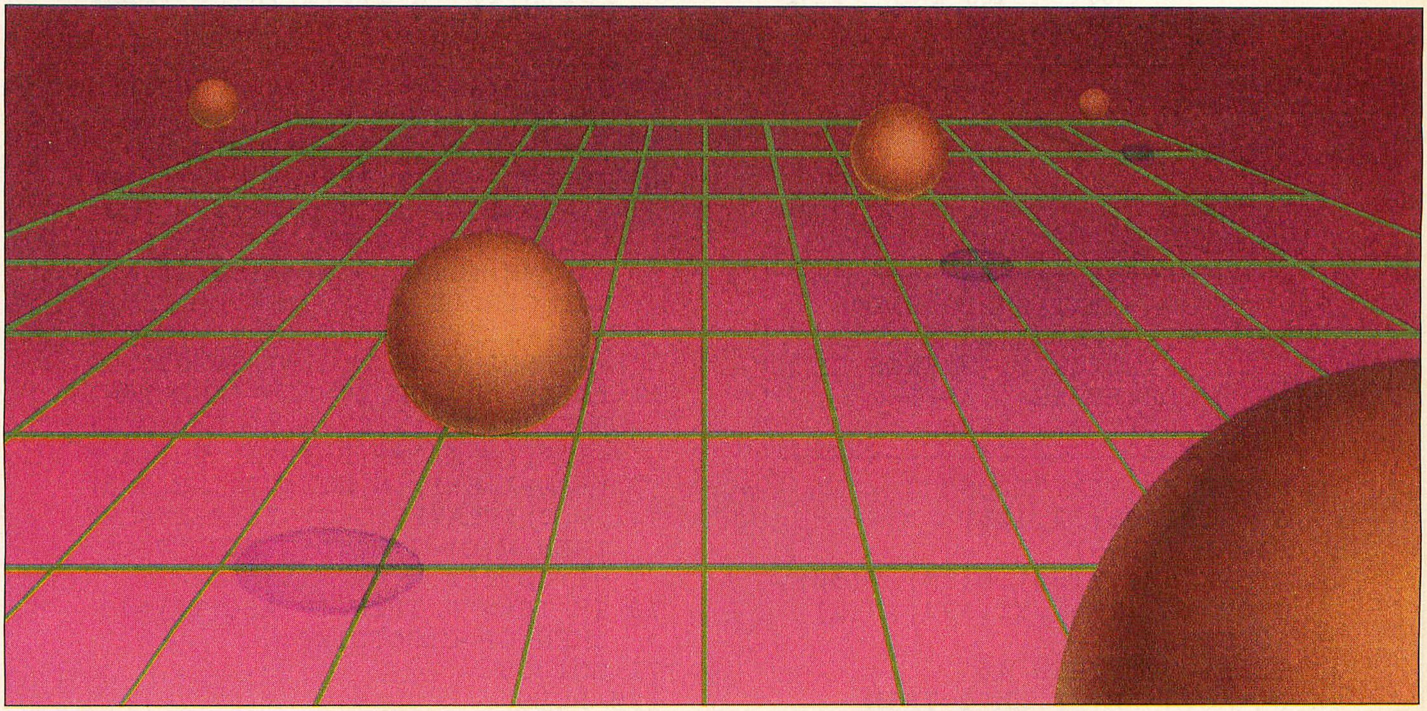
Finally, you must choose the size (magnitude) of the blips and the degree of twist imposed on them.

After the numeric parameters have been entered, each blip's center must be defined. To do this, move the cursor to the point at which you want to place a center of gravity. Press the space bar or joystick button. Now move the dot to the outer region of influence. (The distance between the center and outer region is called the *radius of influence* of the blip.) You now have four choices:

Press U for an upward blip — the top of the grid will appear pushed up at one point.

Press D for a downward blip — the grid will appear pulled down at one point.

Patrick Grengs, a math and computer science major, works part-time at 3M's CAD/CAM center. Patrick enjoys graphics and animation programming on his CoCo.



- Press R for a right twist — a *tornado*, moving in a clockwise direction, will appear on the grid.
- Press L for a left twist — The *tornado* will move in a counter-clockwise direction on the grid.

A circle, which indicates the radius of influence, will appear after each blip is completed. Press ENTER after all blips have been defined. The screen will be cleared and the grid created.

A number of nested `FOR NEXT` loops control the grid creation process, but the key to the program is the gravity and twisting algorithms. The gravity algorithms push or pull the grid's vertices toward or away from the various centers of gravity. The distance is determined by a distance function: The further the vertex is from the center of gravity, the less the vertex will be affected. With Linear Gravity, the function is directly proportional to the distance between the vertex and the center of influence. With Normal Gravity, the effect is based on a simple sinusoidal function of distance. Normal Gravity will produce more realistic deformations in the grid.

The twisting algorithms rotate the vertices of the grid in either a clockwise or counter-clockwise manner. The angle of rotation is based on the distance. Linear Twisting gives us an angle directly proportional to the distance. The angle from Normal Twisting is based on a sinusoidal function of distance. As with Normal Gravity, Normal Twisting produces more realistic results.

Here are the parameters for a generic animated grid:

Prompt Question:	**Answer:**
High Resolution (Y/N):	N
Enter X Linear Step:	16
Enter Y Linear Step:	12
Gravity Type:	2 (Normal)
1.Points 2.Grid 3.Checkers:	3
Filling:	1 (Paint)
Horizontal Direction:	2 (Right)
Vertical Direction:	2 (Down)
Enter Magnitude:	1
Max. Angle Twist:	90

Enter a blip at the screen's center, with a large radius of influence. Use either gravity or twisting as the force on the grid. Press ENTER. Now go and get yourself a cup of coffee, since it will take about a half an hour to create your animated display.

In order to save your high-resolution/animated display, press BREAK to exit from the display, and use these commands for each of the following:

- Enter `CSAVEM"`*filename*`",1536,7679,0` to save a high-resolution grid onto tape.
- Enter `SAVEM"`*filename*`",3584,9727,0` to save a high-resolution grid onto disk.
- Enter `CSAVEM"`*filename*`",1536,13833,0` to save an animated grid onto tape.
- Enter `SAVEM"`*filename*`",3584,15881,0` to save an animated grid onto disk.

Use the following procedure to view any files you save:

1. `RUN "GRAVGRID"`.
2. Press BREAK.
3. `LOADM"`*filename*`"`.
4. Type `GOTO 190`, and press ENTER
5. Control the keyboard speed using A through Z. Pressing A creates a fast display. The farther you move through the alphabet, the slower your display will become.

I hope that you enjoy *Gravitational Grid* and its demonstration of the CoCo's graphics display power. I welcome any improvements or questions you might have about the program.

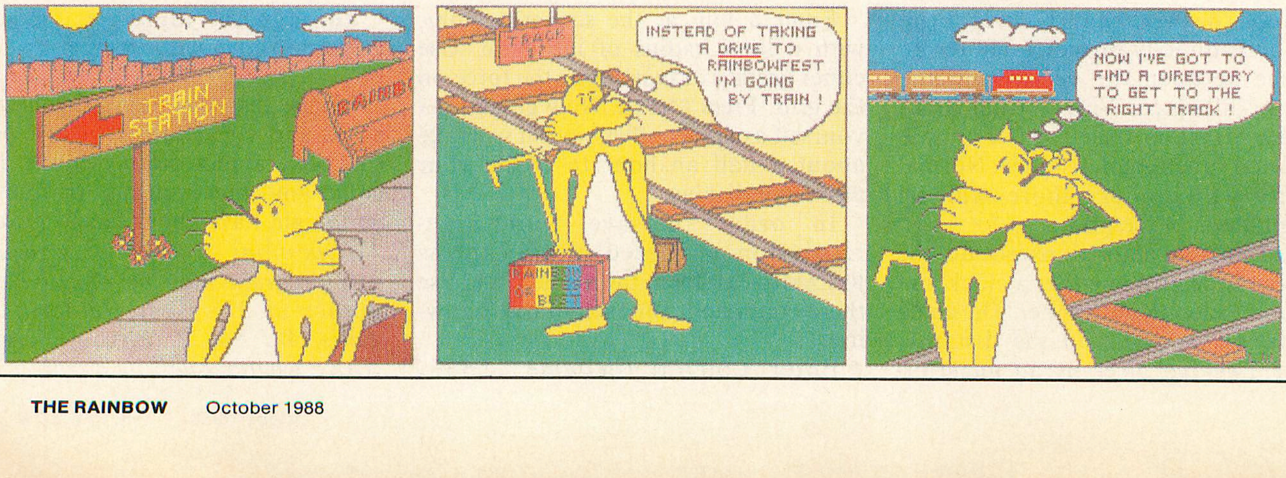
(Questions or comments regarding this program may be directed to the author at 375 West Hathorn, River Falls, WI 54022. Please enclose an SASE when requesting a reply.) ☐

57	2	370	106
69	70	920	205
150	205	END	12
194	48		

The listing: GRAVGRID

```
0 GOTO 2
1 GOTO 5
2 PCLEAR 8
3 GOTO 1
5 '----------------------------'
  '     GRAVITATIONAL GRID     '
  '          VR: 3.1           '
  '  BY: PATRICK D. GRENGS II  '
  '     DECEMBER , 1985        '
  '  RV: JULY 27, 1986         '
  '----------------------------'
10 CLEAR200:PLAY"L255"
15 E$=STRING$(32,128)
16 PI=ATN(1E+9)
20 DIM X(50),Y(50),D(50),V(50),
   G(50),XT(256),YT(192),N(1)
25 GOSUB900
30 IF H$="Y" THEN 45
32 R1=XS/4*XM:IF XM=1 THEN
   S1=-3*R1 ELSE S1=0
34 R2=YS/4*YM:IF YM=1 THEN
   S2=-3*R2 ELSE S2=0
45 P$="O5V15CAFDB"
50 PMODE4,1:PCLS:SCREEN1,1
52 X=128:Y=96:TG=0
55 IF JOYSTK(0)<9 AND X>7 THEN
   X=X-8
56 IF JOYSTK(0)>54 AND X<248THEN
   X=X+8
57 IF JOYSTK(1)<9 AND Y>7 THEN
   Y=Y-8
58 IF JOYSTK(1)>54 AND Y<184THEN
   Y=Y+8
60 IF(PEEK(343)AND8)=0 AND X>1
   THEN X=X-2
61 IF(PEEK(344)AND8)=0 AND X<254
   THEN X=X+2
62 IF(PEEK(341)AND8)=0 AND Y>1
   THEN Y=Y-2
63 IF(PEEK(342)AND8)=0 AND Y<190
   THEN Y=Y+2
65 PUT(X,Y)-(X+1,Y+1),N,NOT:PLAY
   "L255":PUT(X,Y)-(X+1,Y+1),N,
   NOT
67 IFPEEK(345)<>255 AND TG=0THEN
   TG=TG+1:A=X:B=Y:PUT(A,B)-(A+1
   ,B+1),N,NOT:PLAYP$:GOTO 55
68 I$=INKEY$:IF(I$="U" OR I$="D"
   ) AND TG=1 THEN C=C+1:X(C)=A:
   Y(C)=B:D(C)=SQR((A-X)^2+(B-Y)
   ^2)*MM:PUT(A,B)-(A+1,B+1),N,
   NOT:CIRCLE(A,B),D(C):PLAYP$:
   G(C)=1:IF I$="U" THEN V(C)=-1
   :GOTO52 ELSE V(C)=1:GOTO52
69 IF(I$="R" OR I$="L") AND TG=1
   THEN C=C+1:X(C)=A:Y(C)=B:D(C)
   =SQR((A-X)^2+(B-Y)^2):PUT(A,B
   )-(A+1,B+1),N,NOT:CIRCLE(A,B)
   ,D(C):PLAYP$:G(C)=2:IF I$="R"
   THEN V(C)=1:GOTO52 ELSE V(C)=
   -1:GOTO52
70 IF I$<>"" THEN IF ASC(I$)=13
   THEN GP=C:GOTO100
71 GOTO55
100 PCLS
110 IF H$<>"Y" THEN FOR PM=1 TO
    7 STEP 2:PMODE2,PM:SCREEN1,1
    :PCLS:J=0:CC=0
115 FOR K=S2-YS*1 TO 192+YS STEP
    YS:J=J+1:X=S1-XS:Y=K:ON G
    GOSUB500,510:XT(J)=X:YT(J)=Y
    :NEXT
120 FOR X1=S1 TO 256+XS STEP XS:
    Z=0:CC=CC+1:IFCC=2 THEN CC=0
121 C=CC
125 X=X1:Y=S2-YS:ON G GOSUB500,
    510:XT=X:YT=Y
130 FOR Y1=S2 TO 192+YS STEP YS:
    C=C+1:Z=Z+1
135 X=X1:Y=Y1:ON G GOSUB500,510:
    PSET(X,Y,5):IF CH>1 THEN
    LINE(XT(Z),YT(Z))-(XT,YT),
    PSET:LINE-(X,Y),PSET:LINE-
    (XT(Z+1),YT(Z+1)),PSET:LINE-
```

CoCo Cat By Logan Ward


TRAIN STATION
INSTEAD OF TAKING A DRIVE TO RAINBOWFEST I'M GOING BY TRAIN !
NOW I'VE GOT TO FIND A DIRECTORY TO GET TO THE RIGHT TRACK !

```
    (XT(Z),YT(Z)),PSET
140 IF CH=3  AND  C/2=INT(C/2)
    THEN ON PT GOSUB170,171
142 XT(Z)=XT:YT(Z)=YT:XT=X:YT=Y
145 NEXT Y1:XT(Z+1)=X:YT(Z+1)=Y:
    NEXT X1
150 S1=S1+R1:S2=S2+R2
160 IF H$<>"Y" THEN NEXT PM:
    GOTO190
165 GOTO999
170 PAINT((XT(Z)+XT+X+XT(Z+1))/4
    ,(YT(Z)+YT+Y+YT(Z+1))/4),1,1
    :RETURN
171 D=0:D1=X:D2=XT:GOSUB290:
    D2=XT(Z):GOSUB290:D2=XT(Z+1)
    :GOSUB290:D1=XT:GOSUB290:
    D1=XT(Z):GOSUB290:D2=XT:
    GOSUB290
172 D1=Y:D2=YT:GOSUB290:D2=YT(Z)
    :GOSUB290:D2=YT(Z+1):GOSUB
    290:D1=YT:GOSUB290:D1=YT(Z):
    GOSUB290:D2=YT:GOSUB290
175 D=D+.0001
177 X3=(XT(Z+1)-XT(Z))/D:
    Y3=(YT(Z+1)-YT(Z))/D:
    X4=(X-XT)/D:Y4=(Y-YT)/D
179 A1=XT(Z):B1=YT(Z):A2=XT:
    B2=YT
180 FOR I=0 TO D:LINE(A1,B1)-
    (A2,B2),PSET:A1=A1+X3:B1=B1+
    Y3:A2=A2+X4:B2=B2+Y4:NEXT:
    RETURN
190 'DISPLAY FRAMES
192 X$=INKEY$:T=10
194 FOR P=1 TO 7 STEP 2:PMODE2,P
    :SCREEN1,1:I$=INKEY$:IF I$<>
    ""THEN T=ASC(I$)*4-256
196 FORI=1 TO T:NEXTI,P:GOTO194
199 FOR P=1 TO 7 STEP 2:PMODE2,P
    :SCREEN1,1:NEXT:GOTO199
200 'LINEAR GRAVITY
220 IF D<D(I) THEN DF=(D(I)-D)/
    D(I):A=A+V(I)*(X(I)-X)*DF:
    B=B+V(I)*(Y(I)-Y)*DF
230 RETURN
250 'NORMAL GRAVITY
270 IF D<D(I) THEN DF=(D(I)-D)/
    D(I):DX=(X(I)-X):A=A+V(I)*
    (DX-DX*SIN(PI*D/D(I))):DY=(Y
    (I)-Y):B=B+V(I)*(DY-DY*SIN
    (PI*D/D(I)))
280 RETURN
290 'RETURN MAX
295 E=ABS(D1-D2):IF E>D THEN D=E
296 RETURN
300 'LINEAR TWIST
340 IF D<D(I) THEN AG=AN*V(I)*
    (D(I)-D)/D(I):X4=X-X(I):Y4=
    Y-Y(I):X=X4*COS(AG)-Y4*SIN
    (AG)+X(I):Y=X4*SIN(AG)+Y4*
    COS(AG)+Y(I):A=A+X5-X:
    B=B+Y5-Y
350 RETURN
370 'NORMAL TWIST
410 IF D<D(I) THEN AG=AN*V(I)*
    (1-COS(PI*(D(I)-D)/D(I))):
    X4=X-X(I):Y4=Y-Y(I):X=X4*
    COS(AG)-Y4*SIN(AG)+X(I):Y=
    X4*SIN(AG)+Y4*COS(AG)+Y(I)
420 RETURN
500 A=0:B=0:FOR I=1 TO GP:D=SQR(
    (X-X(I))*(X-X(I))+(Y-Y(I))*
    (Y-Y(I))):ON G(I) GOSUB 200,
    300:GOTO520
510 A=0:B=0:FOR I=1 TO GP:D=SQR(
    (X-X(I))*(X-X(I))+(Y-Y(I))*
    (Y-Y(I))):ON G(I) GOSUB 250,
    370
520 NEXT I:X=X+A:Y=Y+B:IF X<0
    THEN X=0 ELSE IF X>255 THEN
    X=255
525 IFY<0 THEN Y=0 ELSE IF Y>191
    THEN Y=191
530 RETURN
900 CLS0
910 PRINT@4,"-=< GRAVITY INFLUXO
R >=-";
915 PRINT@96,"HIGH RESOLUTION (Y
/N)";:INPUT H$
920 PRINT@128,"ENTER X LINEAR ST
EP:";:INPUT XS:IF XS<1 OR XS>64
    THEN PRINT@128,E$;:GOTO920
930 PRINT@160,"ENTER Y LINEAR ST
EP:";:INPUT YS:IF YS<1 OR YS>64
    THEN PRINT@160,E$;:GOTO930
950 PRINT@192,"GRAVITY TYPE: 1>L
INEAR  2>NORMAL";:INPUT G:IF G<1
    OR G>2 THEN PRINT@192,E$;E$;
    :GOTO950
955 PRINT@224,"<1> POINTS <2> GR
ID <3> CHECKERS";:INPUT CH
957 IF CH=3  THEN PRINT@256,
    "FILLING: 1>PAINT 2>LINEAR";
    :INPUT PT:IF PT<1 OR PT>2
    THEN PRINT@256,E$:GOTO957
959 IF H$="Y" THEN 970
960 PRINT@288,"HORZ. DIR. 1-LEFT
 2-RIGHT";:INPUT XM:IF XM<1 OR
    XM>2 THEN PRINT@288,E$:GOTO
    960
962 XM=XM*2-3
965 PRINT@320,"VERT. DIR. 1-UP 2
-DOWN";:INPUT YM:IF YM<1 OR YM>2
    THEN PRINT@320,E$;:GOTO965
967 YM=YM*2-3
970 PRINT@352,"ENTER MAGNITUDE:"
    ;:INPUT MM:IF MM=0 THEN MM=1
980 PRINT@384,"ENTER MAX. ANG. T
WIST:";:INPUT AN
985 AN=AN/90*PI
990 RETURN
999 SCREEN1,1:GOTO999
```

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

For greater convenience, your high scores may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`.

★ Current Record Holder ● Shutout

ADVANCED STAR*TRENCH (THE RAINBOW, 7/86)

4,750	★Stephane Martel, Laval, Quebec
4,475	David Schaller, Clarkston, WA
4,500	Frankie DiGiovanni, Olney, MD
4,300	Jeffrey Warren, Waynesville, NC
3,960	Maurice MacGarvey, Dawson Creek, British Columbia

ASTRO BLAST *(Mark Data)*

48,825	★Tony Bacon, Mt. Vernon, IN

BEE ZAPPER (THE RAINBOW, 9/87)

15,785	★David Hartmann, Osoyoos, British Columbia
12,825	Frederick Lajoie, Middleton, Nova Scotia
12,350	Tom Carpenter, Palenville, NY
12,175	Sara Mittelstaedt, Kiel, WI
11,675	Daniel Hartmann, Osoyoos, British Columbia

BLITZ (THE RAINBOW, 6/88)

32,440	★Joel Klein, Indianapolis, IN

BOUNCING BOULDERS *(Diecom Products)*

10,930	★Patrick Garneau, Ste-Croix, Quebec

BREWMASTER *(NOVASOFT)*

46,175	★Wendy Staub, Moundsville, WV

CANYON CLIMBER *(Radio Shack)*

1,725,100	★John Guptill, Columbia, MO
1,627,500	Matthew Fumich, Munford, TN
293,200	Alan Kramer, Cooksville, MD
213,400	Sara Mittelstaedt, Kiel, WI
202,000	David Brown, New Waterford, Nova Scotia

CASHMAN *(MichTron)*

9,870	★Martin Parada, Arcadia, CA

COLOR BASEBALL *(Radio Shack)*

238-0	★●John Valentine, Marlborough, CT
137-0	●Jennifer Johnson, Meriden, CT
130-0	●Matthew Snider, Pinehurst, TX
125-0	●Andrew Smith, Cincinnati, OH
119-0	●Adam Silverstein, Chicago, IL
111-2	David Czarnecki, Northhampton, MA
96-0	●Chad Blick, Irwin, PA
74-0	●Mike Korte, Vienna, VA
43-0	●Jason Kopp, Downs, IL
28-0	●Kelly Jones, West Salem, OH

COLOR CAR *(NOVASOFT)*

343,075	★Duncan Cameron, Chippewa Falls, WI
316,550	Alan Martin, Cornwall, Ontario
113,970	Chad Blick, Irwin, PA
110,870	Martin Parada, Arcadia, CA

COLOR POKER (THE RAINBOW, 4/83)

44,022,600	★Earl Foster, Lynchburg, VA

THE CONTROLLERS (THE RAINBOW, 2/88)

148	★Phil Holsten, Moraga, CA
188	Frederick Lajoie, Middleton, Nova Scotia

DEF MOV (THE RAINBOW, 1/87)

43,806	★Domingo Martinez, Miami, FL
35,331	David Schaller, Clarkston, WA
31,673	Douglas Bacon, Middletown, CT
30,753	Pasha Irshad, Silver Spring, MD
30,326	Frederick Lajoie, Middleton, Nova Scotia

DEMOLITION DERBY *(Radio Shack)*

100,500	★Richard Winkelbauer, Bronx, NY

DEMON ATTACK *(Imagic)*

279,435	★Jon Hobson, Plainfield, WI
202,260	Tom Briggs, Hillsdale, NY
89,285	Upton Thomas, Arnold, MD

DEMON ATTACK (continued)

72,410	Glenn Hodgson, Aberdeenshire, Scotland
67,760	Jim Davis, Sandwich, IL

DESERT PATROL *(Arcade Animation)*

234,300	★Steven Turcotte, Matane, Quebec

DESERT RIDER *(Radio Shack)*

80,703	★Thomas Payton, Anderson, SC
65,351	Jason Hackley, Clinton, CT
64,789	Roby Janssen, Clear Lake, IA
63,014	Rebecca Henderson, Ballston Spa, NY
62,702	William Currie, Bryans Road, MD

DEVIL ASSAULT *(Tom Mix)*

1,866,100	★Stephane Martel, Laval, Quebec
623,550	Dale Krueger, Maple Ridge, British Columbia
75,000	Blake Cadmus, Reading, PA
40,800	Benoit Landry, Drummondville, Quebec

DONPAN *(Radio Shack)*

53,100	★Jim Davis, Sandwich, IL
52,600	Eric Olson, Wheaton, IL

DOWNLAND *(Radio Shack)*

99,980	★Danny Wimett, Rome, NY
98,985	Karl Gulliford, Summerville, SC
97,740	Stephane Deshaies, Beloeil, Quebec
89,490	Neil Edge, Williston, FL
77,254	Tom Audas, Fremont, CA
73,346	Jean-Francois Morin, Loretteville, Quebec
70,142	Chris Goodman, Baltimore, MD
68,142	Cooper Valentin, Vavenby, British Columbia
67,721	Keith Yampanis, Jaffrey, NH
62,442	Eddie Lawrence, Pasadena, Newfoundland
55,300	Patrico Gonzalez, Buenos Aires, Argentina
50,362	Jennifer Johnson, Meriden, CT
49,500	Danny Perkins, Clifton Forge, VA
49,441	Kevin Pater, Port Alberni, British Columbia
49,254	David Brown, New Waterford, Nova Scotia
44,281	Kelly Jones, West Salem, OH
43,502	Mike Ells, Charlotte, MI
43,369	Jason Kloostra, Jenison, MI
41,896	Antonio Hidalgo, San Jose, Costa Rica
40,360	Jesse Binns, Phoenix, AZ
35,611	Adam Broughton, Morris, PA
35,169	Daniel Norris, New Albany, IN
23,649	Jim Herr, Newton, WI
23,257	Courtney Shaffer, La Grangeville, NY

DRACONIAN *(Tom Mix)*

114,470	★Donna Ashby, Annandale, VA

ENCHANTER *(Infocom)*

400/223	★Konnie Grant, Toledo, OH

ESCAPE 2012 *(Computerware)*

202	★Roy Grant, Toledo, OH
199	Milan Parekh, Anaheim, CA

FIRESTORM (THE RAINBOW, 1/86)

22,505	★Chad Presley, Luseland, Saskatchewan
11,250	Stephane Martel, Laval, Quebec
5,680	Kathy Rumpel, Arcadia, WI
3,760	Rick Beevers, Bloomfield, MN
3,505	Blake Cadmus, Reading, PA

GALACTIC ATTACK *(Radio Shack)*

31,100	★Upton Thomas, Arnold, MD
29,030	David Czarnecki, Northhampton, MA
26,370	Jeff Remick, Warren, MI
22,250	Dave Staub, Moundsville, WV
11,830	Sheldon Penney, Green Bay, Newfoundland

GALAGON *(Spectral Associates)*

751,020	★Sofia Giorgi, Brasilia, Brazil
357,890	Jason Clough, Houston, TX
328,820	Bernard Burke, Lee's Summit, MO
249,960	Matthew Fumich, Munford, TN
169,410	Danny Dunne, Pittsfield, NH

GANTELET *(Diecom Products)*

45,235,820	★Ken Hubbard, Madison, WI
23,643,720	Geran Stalker, Rivordalo, GA
20,921,490	Randall Edwards, Dunlap, KS
10,222,940	Clinton Morell, Sacramento, CA
7,493,340	Stirling Dell, Dundalk, Ontario
515,980	Matthew Heid, Fifelake, MI

GANTELET II *(Diecom Products)*

17,701,060	★Bryan Bell, Manassas, VA

GHANA BWANA *(Radio Shack)*

2,350,750	★Michael Heitz, Chicago, IL
702,520	Joseph Delaney, Augusta, GA
282,070	Kelly Jones, West Salem, OH
105,820	David Reash, Hadley, PA

GIN CHAMPION *(Radio Shack)*

1,120-0	★●Kim Johns, Port Cog., British Columbia

GRANDPRIX CHALLENGE *(Diecom Products)*

67,710	★H. Dingwell, Litchfield, CT

GROBOT *(Children's Computer Workshop)*

9,665	★Wendy Staub, Moundsville, WV
8,090	Curt Lebel, Louisville, KY

HELICOPTER HERO (THE RAINBOW, 3/88)

103	★Phil Holsten, Moraga, CA

HITCHHIKER'S GUIDE TO THE GALAXY *(Infocom)*

400/359	★Roy Grant, Toledo, OH
400/422	Jeff Holtham, Waterloo, Ontario
400/510	Brad Wilson, Lithia Springs, GA

INTERBANK INCIDENT *(Radio Shack)*

4,861	★Shara and Chris Euton, Lilburn, GA

IRON FOREST *(Diecom Products)*

3,173,200	★Charles Boyd, Amarillo, TX
2,676,300	Janet Boyd, Amarillo, TX
1,141,650	Craig Pennell, Amarillo, TX
1,013,100	William Weller, Kailua, HI
595,700	Daniel Wibier, Santa Rosa, CA

JOKER POKER (THE RAINBOW, 3/87)

62,067,906	★Carole Rueckert, Mansfield, OH
21,733,284	Jon Fogarty, Yale, MI
8,179,710	Brenda Kim, Athens, OH
3,796,898	Curtis Trammel, Murphysboro, IL
2,793,285	Blain Jamieson, Kingston, Ontario

JUNIOR'S REVENGE *(Computerware)*

2,503,000	★Stephane Martel, Laval, Quebec
257,600	Keith Cohen, Rocky Mount, NC

JUNKFOOD (THE RAINBOW, 11/84)

535,760	★Charlie Ginn, Augusta, GA
18,990	Joel Klein, Indianapolis, IN

KING PEDE *(T & D Software)*

83,855	★Mike Snyder, Allen, OK

KNOCK OUT *(Diecom Products)*

183,675	★Rush Caley, Port Orchard, WA
162,555	Martin Parada, Arcadia, CA
147,235	Mike LeBrun, Cornwall, Ontario

KORONIS RIFT *(Epyx)*

186,710	★Tony Harbin, Cullman, AL

SCOREBOARD

KORONIS RIFT (continued)
- 184,180 Russell Johnson, Sarnia, Ontario
- 184,120 John Farrar, Lebanon, TN
- 174,810 Donald Cathcart, Halifax, Nova Scotia
- 133,990 Paul Blessing, Spring, TX

KUNG-FU DUDE *(Sundog Systems)*
- 32,000 ★Tony Geitgey, University Park, PA
- 12,150 Cody Deegan, Fallon, NV

THE LAIR *(Freebooter Software)*
- 112,940 ★James Walton, Pittsburgh, PA

LASER SURGEON: THE MICROSCOPIC MISSION *(Activision)*
- 42,767 ★Joe Stanley, Harrisburg, IL

LUNAR-ROVER PATROL *(Spectral Associates)*
- 37,890 ★Dave Staub, Moundsville, WV
- 30,000 Vincent Tremblay, Matane, Quebec

MAGIC OF ZANTH *(Computerware)*
- 31 ★Paul Summers, Orange Park, FL
- 44 Matthew Smith, Courtenay, British Columbia
- 45 Michael Green, Ware, MA
- 47 Robert Williams, Yellowknife, Northwest Territory

MARBLE MAZE *(Diecom Products)*
- 353,220 ★David Boland, Dubuque, IA
- 17,530 Dave Staub, Moundsville, WV

MEGA-BUG *(Radio Shack)*
- 10,044 ★Douglas Bacon, Middletown, CT
- 9,016 Heather Richwalski, Medford, WI
- 8,756 Gail Bacon, Middletown, CT
- 8,199 Eric Mellon, Newark, DE
- 6,404 David Hartmann, Osoyoos, British Columbia

MEMOCARDS (THE RAINBOW, 8/87)
- 1,418 ★Edward Kavanaugh, North Easton, MA
- 1,414 Sara Mittelstaedt, Kiel, WI
- 1,122 Phil Holsten, Moraga, CA

MISSION: F-16 ASSAULT *(Diecom Products)*
- 468,750 ★Karen Jessen, Cleveland, OH
- 355,570 Stirling Dell, Dundalk, Ontario
- 318,160 Jeremy Pruski, Sandwich, IL
- 144,510 Donald Cathcart, Halifax, Nova Scotia
- 137,920 Mike Grant, Fresno, CA

MISSION: RUSH'N ASSAULT *(Diecom Products)*
- 361,750 ★Clay Jones, Wooster, OH
- 195,250 Kelly Jones, West Salem, OH

MOON SHUTTLE *(Datasoft)*
- 16,220 ★Christopher Cromwell, Monument, CO

ONE-ON-ONE *(Radio Shack)*
- 1,302-0 ★•Thomas Payton, Anderson, SC
- 1,276-0 •Jonathan Dorris, Indianapolis, IN
- 1,260-0 •Brandon Reece, Chickamauga, GA
- 1,242-0 •William Currie, Bryans Road, MD
- 1,210-0 •Gregg Thompson, Chesterfield, VA

OUTHOUSE *(MichTron)*
- 38,640 ★Dave Staub, Moundsville, WV

PAC PANIC *(Cougar)*
- 34,950 ★Heather Hamblen, Bar Harbor, ME

PEGASUS AND THE PHANTON RIDERS *(Radio Shack)*
- 329,000 ★Joseph Delaney, August, GA
- 303,100 Mike Grant, Fresno, CA
- 261,000 Domingo Martinez, Miami, FL
- 225,300 Richard Adams, Jr., Alvarado, TX
- 114,100 Kreig Bryson, Woodstock, GA
- 85,000 Ronald Reynolds, Ottawa, IL

PITFALL II *(Activision)*
- 197,048 ★Keith Catrett, Montgomery, AL
- 164,088 John Akan, Chippewa Falls, WI
- 159,400 David Cornette, Green Bay, WI
- 104,479 David Stewart, Kent, OH

PITSTOP II *(Epyx)*
- 54 ★David Boland, Dubuque, IA
- 54 ★Rusty Breitbach, Rickardsville, IA
- 54 ★Jeff Coburn, Easton, PA
- 54 ★Walter Hearne, Pensacola, FL
- 54 ★Sean Noonan, Green Bay, WI
- 54 ★Thomas Payton, Anderson, SC
- 54 ★Jeff Szczerba, Sturtevant, WI
- 54 ★Brad Wilson, Lithia Springs, GA
- 51 Christian Grenier, Valleyfield, Quebec
- 49 Randy Venable, Coal City, WV

POOYAN *(Datasoft)*
- 373,900 ★Duncan Cameron, Chippewa Falls, WI
- 236,650 Jeff Mrochuk, Edmonton, Alberta

POOYAN (continued)
- 111,600 William Cathey, Kings Mtn., NC

POPCORN *(Radio Shack)*
- 105,560 ★Heather Condit, Grafton, ND
- 26,889 Claude Jalbert, Matane, Quebec
- 20,800 Kristopher Santos, Laurel, MD

PYRAMID *(Radio Shack)*
- 220 ★Jason Ebbeling, Berkshire, MA

PYRAMID 2000 *(Radio Shack)*
- 220 ★Darren King, Yorkton, Saskatchewan
- 220 ★Mike Snyder, Allen, OK
- 125 Chris VanOosbree, Emmetsburg, IA
- 100 Peter Antonacopoulos, Toa Baja, Puerto Rico

QUIX *(Tom Mix)*
- 8,407,772 ★John Haldane, Tempe, AZ
- 1,404,000 Curtis Goodson, Sao Paulo, Brazil
- 1,201,383 Milan Parekh, Anaheim, CA
- 1,003,104 Elisa Goodson, Sao Paulo, Brazil
- 326,192 Martin Parada, Arcadia, CA

RADIO BALL *(Radio Shack)*
- 1,116,050 ★Richard Winkelbauer, Bronx, NY
- 1,062,190 Eric Mellon, Newark, DE
- 800,150 Mike Snyder, Allen, OK
- 760,380 Jake Runge, Franklin, OH
- 581,730 David Morrison, Brewer, ME

RED ALERT *(Ark Royal)*
- Ensign-Class 4 ★Richard Kelton, Newport News, VA

RESCUE ON FRACTALUS *(Epyx)*
- 1,000,948 ★Steven Ujvary, Calgary, Alberta
- 323,167 Kenneth Hill, Severna Park, MD
- 292,633 David Richards, Huntington, WV
- 288,084 Donald Cathcart, Halifax, Nova Scotia
- 270,000 Russell Johnson, Sarnia, Ontario

RETURN OF THE JET-I *(ThunderVision)*
- 336,563 ★Jesse Collicott, Inman, KS

RETURN OF JUNIOR'S REVENGE *(Colorware)*
- 1,792,800 ★Chad Presley, Luseland, Saskatchewan

ROGUE *(Epyx)*
- 71,833 ★Jon Fogarty, Yale, MI
- 63,934 Marshall Weisenburger, Quincy, IL
- 43,222 Hans Lutenegger, Madison, IA
- 27,542 Melanie Lapoint, Fitchburg, MA
- 21,682 Paul Blessing, Spring, TX

SAILOR MAN *(Tom Mix)*
- 231,700 ★Luis Camino, Lima, Peru

SANDS OF EGYPT *(Radio Shack)*
- 67 ★Tristan Terkuc, Richmond, Ontario
- 82 Edward Rocha, Cobleskill, NY
- 85 Paul Summers, Orange Park, FL
- 86 Roy Grant, Toledo, OH
- 87 Neil Haupt, Elyria, OH

SAUCER DEFENSE *(THE RAINBOW, 4/87)*
- 40,000 ★David Hartmann, Osoyoos, British Columbia
- 4,000 Frankie DiGiovanni, Olney, MD

SHAMUS *(Radio Shack)*
- 25,450 ★John Garness, Newell, SD

SHOOTING GALLERY *(Radio Shack)*
- 27,270 ★Jocelyn Hellyer, Montgomery, IL
- 25,510 Donald Knudson, Minot, ND
- 20,480 Kevin Pereira, Corsicana, TX

SHOOT'N RANGE (THE RAINBOW, 8/87)
- 55,623 ★Paul Robbins, Picayune, MS
- 14,702 Richard Winkelbauer, Bronx, NY
- 13,794 Phillip Holsten, Modesto, CA
- 6,082 David Morrison, Brewer, ME
- 5,433 Benoit Landry, Drummondville, Quebec

SLAY THE NERIUS *(Radio Shack)*
- 73,091 ★Jeff Remick, Warren, MI

SPACE ASSAULT *(Radio Shack)*
- 13,110 ★Jeff Remick, Warren, MI
- 7,280 Jason Kopp, Downs, IL
- 6,200 John Weaver, Amsterdam, NY

SPEED RACER *(MichTron)*
- 94,430 ★Christopher Cromwell, Monument, CO

SPEEDSTER (THE RAINBOW 8/87)
- 103,140 ★Richard Winkelbauer, Bronx, NY
- 88,090 Jason Landreth, Texico, IL
- 60,430 Jennifer Johnson, Meriden, CT
- 44,540 Kevin Pereira, Corsicana, TX
- 37,970 Frederick Lajoie, Middleton, Nova Scotia

SPIDERCIDE *(Radio Shack)*
- 27,730 ★Mike LeBrun, Cornwall, Ontario
- 3,460 David Morrison, Brewer, ME
- 2,040 Wendy Straub, Moundsville, WV
- 1,840 Dave Staub, Moundsville, WV

SPRINGSTER *(Radio Shack)*
- 303,520 ★Mavis Hartmann, Osoyoos, British Columbia
- 200,670 Denise Root, Thorndale, PA

STAR BLAZE *(Radio Shack)*
- 6,550 ★Flint Weller, Swarthmore, PA

STRATA (THE RAINBOW, 5/88)
- 2,768 ★H. Dingwell, Litchfield, CT

TEMPLE OF ROM *(Radio Shack)*
- 604,000 ★Troy Graham, Arnold, MD
- 507,700 Adam Broughton, Morris, PA
- 303,600 Tim Hennon, Highland, IN
- 138,400 Gary Budzak, Westerville, OH
- 125,200 Michelle Murray, Salem, IN

THEXDER *(Sierra On-Line)*
- 1,411,700 ★Steve Hallin, Biloxi, MS
- 1,314,100 Frankie DiGiovanni, Olney, MD
- 312,300 Timothy DeJong, Rock Valley, IA
- 274,300 H. Dingwell, Litchfield, CT
- 195,000 Emmett Keyser, Napa, CA

TREKBOER *(Mark Data)*
- 123 ★Roy Grant, Toledo, OH
- 132 Matthew Fumich, Munford, TN

TRIG ATTACK *(Sugar Software)*
- 196,000 ★Cassaundra Stewart, Sacramento, CA

VARLOC *(Radio Shack)*
- 2,032 ★Tony Harbin, Cullman, AL
- 2,032 ★Edward Rocha, Cobleskill, NY
- 2,011 Antonio Souza III, North Dartmouth, MA
- 2,008 Philip Puffinburger, Winchester, VA
- 1,995 Denise Rowan, Minneapolis, MN

VICIOUS VIC (THE RAINBOW, 7/86)
- 18,813 ★Talib Khan, Bronx, NY
- 15,063 John Conley, Everett, WA
- 14,613 Carolyn de Lambert, Everett, WA
- 11,902 Martha James, Swarthmore, PA
- 10,489 Karl Gulliford, Summerville, SC

WARP FACTOR X *(Prickly-Pear)*
- 10,577,051 ★Doug Lute, Clymer, PA

WILDWEST *(Tom Mix)*
- 35 ★Paul Summers, Orange Park, FL

WISHBRINGER *(Infocom)*
- 400/201 ★Brad Wilson, Lithia Springs, GA

WIZARD'S DEN *(Tom Mix)*
- 593,950 ★Richard Winkelbauer, Bronx, NY
- 195,050 Mark Touchette, Preston, CT

ZAKSUND *(Elite Software)*
- 357,550 ★Martin Parada, Arcadia, CA
- 268,350 Tony Bacon, Mt. Vernon, IN
- 44,900 Michael Adams, Columbia, SC
- 39,950 Walter Hearne, Pensacola, FL

ZAXXON *(Datasoft)*
- 2,061,000 ★Byron Alford, Raytown, MO
- 1,950,000 Blake Cadmus, Reading, PA
- 1,630,150 Jon Fogarty, Yale, MI
- 1,300,500 Dan Brown, Pittsford, NY
- 1,100,600 Andrew Urquhart, Metairie, LA
- 376,600 Matthew Yarrows, Easthampton, MA
- 126,300 Roberto Hidalgo, San Jose, Costa Rica

ZEUS *(Aardvark)*
- 4,500 ★Benoit St-Jean, Gatineau, Quebec
- 3,380 Martin Kertz, Forrest City, AR

ZORK I *(Infocom)*
- 350/328 ★Konnie Grant, Toledo, OH
- 350/587 Matthew Yarrows, Easthampton, MA

ZONX (THE RAINBOW, 10/85)
- 12,000 ★Adam Broughton, Morris, PA

— Angela Kapfhammer

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

In response to questions from:

- George Lane: In order for you to complete your quest in *Sands of Egypt*, you must drop the scepter. When the computer says where, type `ON MUMMY`. After you do that, type `GO CRACK`, get the ladder and type `GO CRACK` again. In *Dallas Quest*, type `PULL CURTAIN`.

In *White Fire of Eternity*, I have the ring and I need the pick, but I do not know how to get it.

Michael Duvall
Zanesville, OH

- Troy Ferguson: In order to kill the gargoyle in *Raaka-Tu*, you first have to get the burning lamp and the candle. After you get these two items, go back into the room and go north until the gargoyle comes at you. Type `LIGHT CANDLE WITH LAMP` and immediately leave the room after you drop it.

When you get to the vault and decide to go inside, whatever you do, don't pull the handle.

How do you get past the bronze gates?

Tracy Nahas
New London, CT

- Dan Breault: In *Gates of Delirium*, the people are located in towns, except two; they are located in a dungeon and a castle. The dungeons are the guardians of all but one of 10 gate keys. These gate keys will be needed to win the game. The shrines are in the second world 18 levels below Twin City I. Use the Moon Gates to get to Twin City I. Enter the dungeon inside the town, but make sure you have all your party with 2,400 hitpoints or the depths of the dungeons will kill you.

Duane Whitlock
North East, MD

- Mike Duvall: To get the palm fronds in *Sands of Egypt*, you must go to the pool. From the cliff, go down, west, south and east. Type `GO TREE` and you'll be at the palm tree. Drop all the items and type `CLIMB TREE`. At the top of the tree, type `GET DATES`. Climb down and get your items. Go south and then east. At the pool, type `FEED CAMEL` and he will kneel so you can mount him. Ride the camel and dismount him. You will be at the pyramid. Climb it and get the axe. Go back to the pool by riding the camel. Go to the tree and climb it with the axe. At the top, type `CHOP FRONDS`. Get the fronds and go down. Type `BRAID FRONDS` and you will have a sturdy rope.

Shawn Maloney
Ozone Park, NY

- Jim Barkel: In *Downland*, to get off the rope, go to the right end and push the joystick over to the right while pushing the button. As soon as you are on the slatted part, push the handle to the middle, then push to the right and you'll be on the rope.

In Chamber 6, what is the rope used for when you first walk in?

David Breyer
Cincinnati, OH

Scoreboard:

In *Bedlam*, after getting stuck with the hypodermic needle and returning to your cell, to stop running into the walls type `PLUGH` and you will return to your normal self again.

To get Houdini down, type `UNTIE HOUDINI`. How do you get the straitjacket off him?

How do you wake up the "real doctor" lying unconscious in the corner?

Jerry Hagerty
North Syracuse, NY

Scoreboard:

How do you get Roger the Rogue Elephant to cooperate in *Dallas Quest*? How do you get past the cannibals in order to enter the cave?

Eric Costello
Pine Bluff, AR

Scoreboard:

In *Dallas Quest*, if you want to get the flashlight, you have to pull the curtain in the trading post.

In *Dragon Blade*, how do you get past the stone door after the whirling pool?

Eric Vermette
La Tuque, Quebec

Scoreboard:

I have successfully landed the Heart of Gold on Magrathea in *Hitchhiker's Guide to the Galaxy*, but I cannot unjam the hatch or enter the screening door.

John Knight
Kalamazoo, MI

Scoreboard:

In the *Interbank Incident*, how can I get into the Air Force base in Germany?

In *Enchanter*, how do I find water?

In *Sands of Egypt*, where can I find the scepter?

Kristy Craig
Little Rock AFB, AR

Scoreboard:

In the *Interbank Incident*, I found the code book, computer, disk, cartridge and the IBC special card, but I am not able to find the secret hideout. Please help.

In *To Preserve Quandic*, how do I pass the helicopter on the roof?

Georges Fortin
Baie-St. Paul, Quebec

Scoreboard:

In the *Interbank Incident*, I can't seem to find the crooks.

In *Dallas Quest*, after you enter the barn with the owl, you must kill the rat by typing `DROP OWL`.

In *Sands of Egypt*, the magnifier is used to light the torch from the sun's rays.

Katie Miller
Chino, CA

Scoreboard:

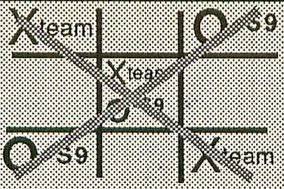
In *Madness and the Minotaur*, in order to get the third spell, I must tie the Hydra up so I can enter the room with the parchment, but after I get the spell, I am told that I need the rope for the next spell. Is there a way to untie the Hydra or to kill it so I can get the rope back?

Duane Whitlock
Northeast, MD

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

XTEAM & OS-9



BOTH WINNERS

All of our OS-9 products work with:
OS-9 version 1
OS-9 version 2
OS-9 Level 2

XTERM

OS-9 Communications program

- Menu oriented
- Upload/download Ascii or XMODEM protocol
- Execute OS-9 commands from within XTERM
- Definable macro keys
- Works with standard serial port, RS232 Pak, or PBJ 2SP Pack, Includes all drivers
- Works with standard screen, Xscreen WORDPAK or DISTO 80 column board

$49.95 with source **$89.95**

XDIR & XCAL

Hierarchial directory
- Full sorting
- Complete pattern matching

OS-9 calculator
- Decimal, Hex, Binary
- +,-,*,/,AND,OR,XOR,NOT

$24.95 with source **$49.95**

XDIS

OS-9 disassembler

$34.95 with source **$54.95**

HARDWARE

512k memory upgrade	$124.95
Ram Software Ram Disk Print Spooler Quick Backup	All three for only $19.95

*Software by ColorVenture

XWORD
OS-9 word processing system

- Works with standard text screen, XSCREEN, WORDPAK, or DISTO
- True character oriented full screen editing
- Full block commands
- Find and Replace commands
- Execute OS-9 commands from within
- Proportional spacing supported
- Full printer control, character size, emphasized, italics, overstrike, underline, super/sub-scripts
- 10 header/footers
- Page numbering in decimal or Roman numerals
- Margins and headers can be set different for even and odd pages

$69.95 with source **$124.95**

XMERGE

Mail merge capabilities for XWORD

$24.95 with source **$49.95**

XSPELL

OS-9 spelling checker, with 20000 and 40000 word dictionaries

$39.95

XTRIO

XWORD/XMERGE/XSPELL

$114.95 with source **$199.95**

XED

OS-9 full screen editor

$39.95 with source **$79.95**

AND FOR RS DOS ...

Call for package price

SMALL BUSINESS ACCOUTING

This sales-based accounting package is designed for the non-accountant oriented businessman. It also contains the flexibility for the accounting oriented user to set up a double entry journal with an almost unlimited chart of accounts. Includes Sales Entry, transaction driven Accounts Receivable and Accounts Payable, Journal Entry, Payroll Disbursement, and Record Maintenance programs. System outputs include Balance Sheet, Income Statement, Customer and Vender status Reports, Accounts Receivable and Payable Aging Reports, Check Register, Sales Reports, Account Status Lists, and a Journal Posting List.

$79.95

INVENTORY CONTROL/SALES ANALYSIS

This module is designed to handle inventory control, with user defined product codes, and produce a detailed analysis of the business' sales and the sales force. One may enter/update inventory data, enter sales, run five sales analysis reports, run five inventory reports, set up product codes, enter/update salesman records, and update the SBAP inventory.

$59.95

PAYROLL

Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Aditional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware

$59.95

PERSONAL BOOKKEEPING 2000

Handles 45 accounts. Enters cash expenses as easily as checks. Handles 26 expense categories. Menu driven and user friendly. **$39.95**

ACCOUNTS RECEIVABLE

Includes detailed audit trails and history reports for each customer, perpares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accting package.

$59.95

ACCOUNTS PAYABLE

Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package.

$59.95

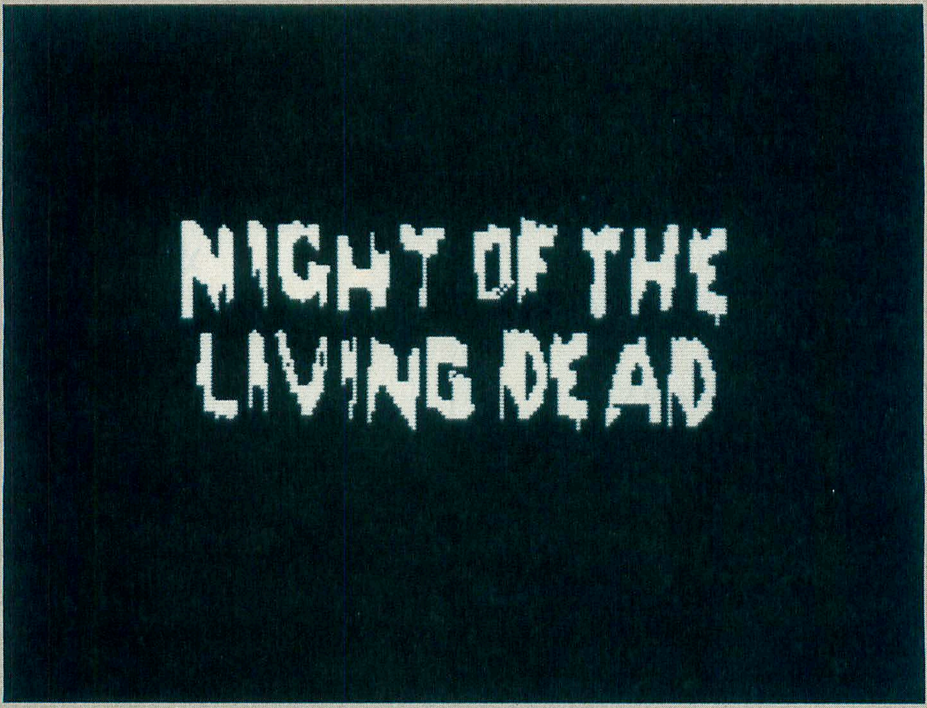
MICROTECH CONSULTANTS INC.

1906 Jerrold Avenue
St. Paul, MN 55112

Dealer Inquiries Invited
Author Submissions accepted
OS-9 is a trademark of Microware

Ordering Information
VISA MasterCard
Add $3.00 shipping & handling, MN residents add 6% sales tax.
Visa, Mastercard, COD (add $3.50), personal checks.

(612) 633-6161



Software CoCo 1, 2 & 3

Night of the Living Dead — An Interactive Nightmare

Apparently you were wrong about that road you thought was a shortcut a couple of hours ago.

You've managed to get yourself totally lost, and it's looking less and less likely that you're going to make it back to school in time for your first day of classes tomorrow.

The only person you've seen for miles is the hitchhiker you picked up over an hour ago. She says her name is Sheena.

Night of the Living Dead begins innocuously enough, but just wait a few minutes. You see, the dead are waking up — they're *very* hungry. And your car is out of gas.

Night of the Living Dead from Adventure Novel Software is a two-disk text Adventure for 64K ECB disk-based CoCos. Unlike the movie of the same name (zombies are the only thing in common), it begins with your character stranded in the middle of nowhere. Without gas, your 1970 Mercury Montego "might as well be a rabbit." You're stuck with a strange woman who wears a Frank Zappa T-shirt and is by turns threatening and polite.

To the east is a cemetery and a church. To the west is an impenetrable thicket. To the north and south the gravel road stretches endlessly and will take you nowhere. But things don't seem hopeless, at least not until a heavily made-up man (like a corpse?) with a gaping hole in his neck shambles toward you. What to do? *I* tried running, but there's nowhere to run.

Adventure Novel Software says that the only goal in *Night of the Living Dead* is to stay alive, which is not an easy feat. I'm embarrassed to tell how far I got — and I even had help.

Unlike most games, there is more reward in solving this Adventure than just the satisfaction in knowing you've done it: A cash prize of $500 is offered to the first person who "survives." To win, an Adventurer must be a registered owner and send in a transcript or written solution by registered mail. The correct entry with the earliest postmark wins. If by December 31, 1988, there is no winner, one will be chosen at random from the owner registration cards mailed back.

Needless to say, I do not have a ghost of a chance of claiming the loot. I died more times than I can remember, and in the most horrible ways. The further along I got, the more spectacular my deaths.

> ***"If you are faint of heart or squeamish of stomach, I recommend you* not *try this game. Literally, heads will roll."***

In my very first death my head struck a sharp object; fortunately, I died immediately. For my second death, I was treated to a screwdriver through the skull (watch out for that man with the gaping hole in his neck). In my third death, my jugular was ripped open and the last thing my dying eyes saw was a zombie having my arm for lunch. For the benefit of those of you swallowing to hold back your last meal, I shall refrain from regaling you with more vivid accounts of my demises.

Night of the Living Dead provides some pretty grotesque descriptions. If you are faint of heart or squeamish of stomach, I recommend you *not* try this game. Literally, heads will roll. And there are colorful descriptions of oozing flesh and sucking sounds (sorry, I had to throw that in) — yet Adventure Novel Software's Bob Schuette says that the gory descriptions have even been toned down in the latest version!

When you see the disk jackets (or if you've seen the Adventure Novel Software ad), you may wonder where "Savage Software" fits into the scheme of things. "Savage Software" is Curtis Fennell, the "editorial" half of *Night of the Living Dead* — Adventure Novel and Schuette are the programming half.

Descriptions of the character's current location are provided at the top of the screen above a black bar. A "clock" in the upper-right corner keeps track of the time and moves. As this is a text Adventure, there are no graphics (Schuette and Fennell say graphics wouldn't do the story justice — your imagination serves better). Text is shown on the 32-character screen. The game is disk-intensive — so leave the Data disk in the drive.

Game play is typical for Adventures of the verb-noun command variety. But commands of many more than two words may be given. There is a help function that shows how to use a variety of commands. You can talk to the characters, question them or ask them to perform a specific task, e.g.: `SHEENA, TELL ME ABOUT FRANK ZAPPA`.

The usual command abbreviations are supported (`N`, `S`, `E`, `W`, `U` and `D`). The "examine" command can be shortened to `X`, the "inventory" command to `I`. Also, there is no inventory limit. The `SCRIPT` command sends all text to the printer.

I am not very experienced with Adventures and so was frustrated when sometimes my "interpreter" would not recognize a reference to something it informed me of just a few moves earlier, or when it wouldn't understand something I thought was totally obvious. A quick rereading of the help screen yielded this advice: "If the game does not understand a verb, try a synonym

Putting the Savage in Savage Software (And the Novel in Adventure Novel)

There are a lot of people who would just as soon read a good book as go to a movie. Some writers can evoke images more vivid than any movie screen can. From his narrative in *Night of the Living Dead*, Curtis Fennell, known to the CoCo market as Savage Software, has shown he is one such writer.

Curtis and Bob Schuette, the writing and programming team behind *Night of the Living Dead*, have been friends since college. It was during those years that Curtis first found out about a new form of computer entertainment — Adventure games. Back then, the games were in their infancy. Even the better ones limited players to two-word commands, and the puzzles did not always make a lot of sense.

When Bob recently contacted Curtis about writing an Adventure for the CoCo, he had no idea that Curtis was already working on one. The game design systems Curtis tried were limiting, and he was invariably disappointed in how the final product worked.

So they decided to join forces. Using Bob's Adventure Novel design system, Curtis brought *Night of the Living Dead* to life. It was a challenge for Curtis to develop the story line without going overboard in grotesque descriptions. Much of the debugging process, in fact, involved rewriting text some players found unappealing. Graphics were removed from the game because they simply could not do it justice. "Without question, the scariest visions exist in the player's own mind," Curtis says.

Schuette believes his exclusive game design system will provide a fresh, new outlook for Adventures. "We're in the business of entertainment. Our goal is to supply the computer industry with unique games that, while challenging, can be solved by most players," he explains.

"Don't get me wrong. These games will never be pushovers. The players will definitely get their money's worth from us. But I also don't want them to get so completely stumped and frustrated that they never get the full enjoyment from finishing the game on their own." A self-taught programmer and chemical engineer, Bob's experience ranges from writing game software to programming industrial process controllers. But he has found some innovative uses for the CoCo: "As an avid fan of windsurfing, I'm constantly interested in what the wind is doing — how fast it is blowing, and whether it is picking up or falling off. By rewiring an old DC motor and putting a set of annometer cups on it, I can constantly monitor the wind speed through my CoCo joystick port. It's kept me from making quite a few useless trips to the lake."

Bob still uses one of the original 64K CoCo 1s and says he has never experienced a failure, even after he has left it on for weeks at a time. This love of his CoCo 1 helped Bob decide to keep his games compatible with all three CoCos.

"I've had some opportunities to work with the new CoCo 3, and I think it is a fine machine," he says, "but I'm sure there are many people out there who want to stay with the older models. It would be a shame if all the new software developed was designed specifically for the CoCo 3. At least for now, you can be sure that one company will still be producing software for all three CoCos." ☐

Zombies 10, People Zip

No, you fool! Stay away from that door — don't go in there! Oh, well, another one bites the dust.

How many times have you watched a hack-and-slash movie and actually cheered for the monster because the characters are so *stupid* they deserve to die?

I mean, if you're staying in a hotel (or a summer camp) where a body count is taken daily, would *you* traipse off la-ti-da by yourself to the remotest, spookiest place around and then appear *surprised* when the ax falls? Would you even stick around after the first body is found? Not me — I'd get the @#$%! outta there! You think that you would, too? We think we're so smart. In their shoes, we wouldn't be so stupid, and we'd live a lot longer.

We can be smug in our superiority most of our lives. It is doubtful we'll be menaced by Jason, Freddy or Zombie (thank God!). But *what if?* What if by some means we could pass through the other side of the camera lens and put our wits on the line against the ghoulies.

Night of the Living Dead and Adventures like it let us do this. I tried the game, and I wasn't very successful at surviving. I now have new respect (or sympathy, at least) for those stupid people who blunder boldly into the attic, the cellar and the cemetery. You see — they had no choice. The script wouldn't let them back out and run.

In playing *Night of the Living Dead*, as I knew the goal was to "survive," I thought I would just run up the gravel road until I was safe (zombies are rather sluggish, you know). Well, the game wouldn't let me. It forced me into a situation and made me follow its "script." Of course, how I acted within the confines of the situation was up to me — so I promptly got knocked off.

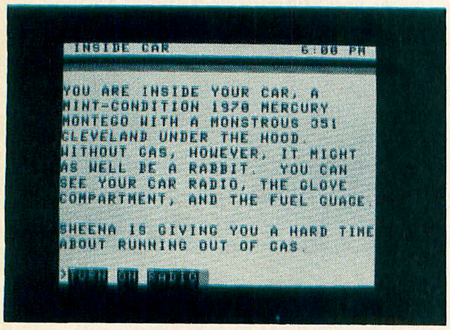
I knew the zombie was steadily creeping up on me, but what was I doing? Checking out the scenery, examining my inventory for a possible weapon, twiddling my thumbs. If I were a character in a horror movie, the audience would probably be cheering my imminent demise. I feel two sayings are applicable here (I'm fond of sayings): "Don't knock something 'til you've tried it," and "Don't criticize unless you've been in someone else's shoes."

And now for the moral of this lunacy: "Don't make fun of horror movie victims just because they walk into obvious traps — *unless* you've survived *Night of the Living Dead.*"

Have a happy Halloween, and watch out for zombies. ☐

---

for it." (Hint: `SEARCH` is sometimes more revealing than `EXAMINE`.)



```
INSIDE CAR                 6:00 PM

YOU ARE INSIDE YOUR CAR, A
MINT-CONDITION 1970 MERCURY
MONTEGO WITH A MONSTROUS 351
CLEVELAND UNDER THE HOOD.
WITHOUT GAS, HOWEVER, IT MIGHT
AS WELL BE A RABBIT.  YOU CAN
SEE YOUR CAR RADIO, THE GLOVE
COMPARTMENT, AND THE FUEL GUAGE.

SHEENA IS GIVING YOU A HARD TIME
ABOUT RUNNING OUT OF GAS.

>TURN ON RADIO
```

The `SAVE` command allows you to stop and save your progress at any game prompt — this is very handy, as it "saves" you from having to start back from the beginning of the game every time you die (which, if you are like me, you will do frequently). When you type `SAVE`, a mini-menu pops up that prompts you for the drive of your "save" disk, then for the game number — you can save five.

After you die, you are asked if you want to restore a previously saved game. If you do, a similar menu prompts you for the drive and the game number. If you indicate you *don't* want to restore a game, you must do a cold start to get back to Disk BASIC.

I tried *Night of the Living Dead* on a CoCo 1, 2 and 3, and it worked fine on all. The only thing it wouldn't work on was an old, gray-case E-board CoCo 1, and that was because of the high-speed poke, I suspect. But most CoCoists will be able to play the game.

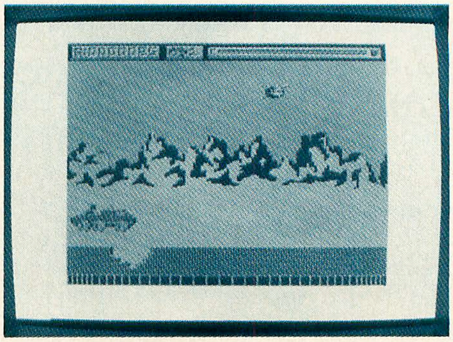
I found *Night of the Living Dead* fun to play, and I especially appreciated the exciting and smooth narrative flow — this Adventure reads better than most. I expect that those who are fans of zombie movies will like the game, and connoisseurs of "ordinary" Adventures will get a kick out of it, too.

(Adventure Novel Software, P.O. Box 8176, Spartanburg, SC 29305, 803-578-7421; $34.95 introductory offer: First product review from this company appearing in THE RAINBOW)

— Lauren Willoughby

Moon-Runner — Souped-Up Lunar Buggy

In *Moon Runner* you command an amphibious patroller armed with laser and overhead missiles. Your mission is to battle enemy forces across the lengths of eight moons and then destroy the Trigan base.



Opposing you is an array of strong enemy forces, including attacking spacecraft, tanks, mines and surface rockets. Even the moon's surface is against you. There are crevices, rocks, trees and cacti among the obstacles you must either jump over or destroy.

While you have nine patrollers to accomplish your mission, they are thin-skinned craft and easily destroyed. When they are gone, the mission is terminated. Also, the patrollers use up fuel quickly. To keep going, you must shoot down the fuel satellites that orbit the moons.

Once you have fought your way to the Trigan base, the game gets harder! You must blast holes in the rotating force shield protecting the Trigan generator. This is not easy — the base shoots back! Because your laser is short-ranged, you must move close to the base, firing your laser constantly. It's a heavyweight slugfest.

Moon Runner is a well-crafted program that takes up a full disk. You must leave the disk in the drive while you are playing because the program accesses the disk throughout the game. Since the nine top scores are recorded, do not write-protect the disk.

Besides joystick control, you also have two keyboard controls. The ENTER key pauses the action, as well as resumes game play. The Q key ends a particular game (your patroller blows up!). You are returned to the main menu to begin again.

The game has complete instructions and is easy to play, but hard to master.

A nice programming touch is the flexibility with which you can play at different levels. For example, if you complete Level 2, you can select levels 3, 2 or 1 to play next. A frustration with most arcade games is losing all your men, tanks, etc., and having to start all over again. That's boring — *Moon Runner* is not!

This is one good arcade game. It runs on the CoCo 1, 2 and 3, with RGB or composite monitors. You will need 32K, one disk drive and a joystick. The scrolling graphics and animation are exceptional, and the CoCo 3 version makes use of the PALETTE command.

For its combination of affordability and playability, *Moon Runner* is one first-class addition to the CoCo library.

(Nick Bradbury, 10500 Sandpiper Lane, Knoxville, TN 37922, 615-966-0172; $15: First product review from this company appearing in THE RAINBOW)

— T.C. Taulli

Software CoCo 1, 2 & 3

Inventory Manager — A Program You Can Count On

Being in business myself, I was more than happy to receive a copy of *Inventory Manager* by Forrest Enterprises for my latest review assignment. Nor could the timing have been any better, as the program arrived in time for me to use with my own inventory.

Inventory Manager is just what the title says. It basically handles all the necessary (not to mention dreaded) tasks involved in recording and updating your inventory records. Actually, about the only thing it doesn't do is take inventory for you.

One of the first things I would like to point out is that *Inventory Manager* comes on a non-protected disk, which makes it possible for you to make a backup copy. Another welcome feature is that the program is written mainly in BASIC, which makes it easy to modify to suit your personal needs.

Modification was necessary in my particular case because I am in the food service business, and the inventory procedure differs a little from that of other types of businesses. I work a lot with weights and fractions, whereas most businesses need only be concerned with the physical count of a particular item. All it took was a phone call to the distributor and my problem was solved.

Upon loading *Inventory Manager* you are greeted with a simple title screen. Pressing any key takes you to the configuration menu, where you tell the program the number of disk drives used, the printer's baud rate, the company name and address, and which version (there are two) of *Inventory Manager* you would like to run. This configuration is a nice feature — systems change. (To save you the time of having to answer these questions every time you load the program, you can use a second boot-up program after configuration. You change the appropriate program lines to match your system, as described in the manual.)

JUBILEX
A fast paced game that requires both skill and quick thinking. Pilot your ship over the planet Jubilex. Avoid shots from the ground while you destroy their aircraft. Complex weapon system. Requires joystick, CoCo III, and disk drive. $25

GAT BACKUP
A 128k CoCo III backup utility that gives you the options to backup only the granules used, a section, or the entire disk. Makes multiple copies. Copies 35 tracks in two passes. Formats and gives directories. Requires CoCo III and disk drive. $15

DIASM
A disassembler that loads a file and allows you to disassemble it as if it were in memory, no matter where the program is really located. Works with auto-executing programs. Many other features. Supports printer. CoCo I, II, or III. Disk only. $20

All programs are in machine language. Add $5 per program if you want the source file included. We pay shipping and sales tax. Write for more information, or send check or money order to:

GSW Software
8345 Glenwood
Overland Park, KS 66212

DON'T JUST DUMP YOUR "PMODE4", "PMODE3" GRAPHICS...

Expand, shrink & stretch 'em with ZOOMDUMP

ZOOMDUMP requires an ext. BASIC CoCo & DMP-105 or compatible printer. Print out "PMODE4" or "PMODE3" graphics screens or any rect. section thereof to within a fraction of an inch of ANY HEIGHT OR WIDTH you specify — up to 7.9" wide, in normal or negative & upright or sideways image. MAKE YOUR GRAPHICS DUMPS FIT THE JOB — NOT VICE VERSA!

Specify tape or disk.
Send check or money order for $14* to:

CODIS ENTERPRISES
2301-C CENTRAL DR., STE. 684
BEDFORD, TX 76021

Sample printouts available upon request if return postage provided.

*Texas residents add 7% sales tax – or else!

RAINBOW CERTIFICATION SEAL

Once you have configured the program for your system, you are presented with the main menu. From here you are given the option of doing such things as creating a new file or printing out inventory, purchase orders and item lists. Or you can sort, edit and move any number of items within your various files.

The first time you run the program you will naturally have to start by creating a file. You will be prompted for the name of the file to be created and then for all the necessary information to set up your own inventory system (this is where the only real difference between Version 1 and 2 will be of any importance).

The first two things you are prompted for are the identification number (up to four digits) and the item order number (a code of up to 10 characters that your supplier uses to identify a particular item), such as a part number.

If your particular business does not require an order number, you may want to use Version 2, which handles all its sorting and file management by use of the item I.D. number alone. This saves a lot of unnecessary typing — you can just press ENTER when prompted for information.

Next you will be asked for an item description (up to 40 characters), the inventory quantity (the amount you have on hand) and the "trigger" order quantity. The trigger order quantity is a useful feature that "triggers" automatic ordering of an item when the inventory quantity of an item matches or falls below the specified trigger quantity.

Next you will be prompted for the "after order" quantity. This along with the trigger order number is how the program decides how much of a particular item needs to be ordered when using the auto-order feature. The last two prompts are the item cost (how much a particular item costs you) and the retail cost (how much you plan to charge for the item).

The best part is that if you should make a mistake while entering any of this information, you can update it at a later time. You can even delete the entire record if you decide you no longer want to carry a particular item. Items can be moved from one file to another or converted to allow files created with Version 1 to be used on Version 2, or vice versa. All of this makes *Inventory Manager* a very flexible and full-featured inventory control and purchase order entry system.

After all the items have been entered into inventory files, *Inventory Manager* can complete what to me used to be some very time-consuming tasks. To start with, placing a purchase order is now as simple as just answering a few prompts. For example, I was able to print out a purchase order containing 71 items, with individual prices calculated and totaled at the bottom, including additional charges (postage and handling, etc.), all in just a couple of minutes. This is a welcome improvement to the usual 30 to 45 minutes spent doing the same thing by hand.

With the inventory printout option I was able to get an entire listing of my stock, including unit cost and total cost for each item — not to mention the total value of my entire stock — with just a few keystrokes. I found this to be exactly what I needed to help determine my operating costs and to prepare my inventory/sales reports (which are required by the company I work for), and I could do it in just a few steps taking less than a half-hour. Now that's a lot of power for your dollar, especially if you compare it to expensive programs out there for some of the *other* machines.

Everything considered, I must say I am *very* pleased with the performance of *Inventory Manager*. It does everything I would expect of a program of this type, and maybe even a little more. In my opinion, if you own a business and find inventory to be a tedious and time-consuming job, I think buying this product would definitely be money well spent!

Inventory Manager comes on a non-

7 Color Printer
NX-1000 RAINBOW

star micronics
MULTI-FONT PRINTER
NX-1000
NEW

The NX-1000 gives you plenty of print options for attractive printing. Four typestyles. Four pitch sizes, in standard and italics for a total of 32 NLQ modes. The NX-1000 Rainbow gives you all these features plus online access to 7 color printing and graphics. Black, blue, red, yellow, green, violet, and orange. Both models have a 1 year warranty, nationwide service and a 30 day online trial.

NX-1000 SPECS: 144 cps Draft, 36 cps NLQ (18 x 23 dot matrix), 4 NLQ Fonts, Italics, Sub & Superscripts, Emphasized, Doublestrike, Proportional, Condensed, International, Downloadable, Quad Tall, Double Tall, Underline, 9+ Pitchs, Forward and Reverse n/216" Line Feeds, Absolute or Relative Vert. & Horz. Tabs, Left, Center or Right Justification, 8 Graphics Modes to 1920 dpl, Macro Instruction, Bidirection, Adjustable Tractor Feed, 200+ Printable Characters, Semi Auto Sheet Feed, Front Panel Soft Touch Control, Epson and IBM Emulate, 4k Data Buffer, Hex Dump.
Rainbow: Same plus color.

NX-1000 SYSTEM INCLUDES:
- Star NX-1000 Printer
- Blue Streak Ultima
- Software Support Trio

$199.95
+$10 Shipping and Insurance
COMPLETE

NX-1000 RAINBOW SYSTEM INCLUDES:
- Star NX-1000 Colour Printer
- Blue Streak Ultima
- Software Trio
- Color Super Gemprint

$284.95
+$10 Shipping and Insurance
COMPLETE

Software Support Trio

TYPE SELECTION/ TUTORIAL
Online instructional program that will select 24 special features of your printer or display methods to incorporate them into your programs.

SUPER GEMPRINT
Will transfer a Pmode 0, 1, 2, 3, or 4 picture screen to printer 8"x11" hardcopy. Black/white, white/black or grey level shading for color.

HI-RES SUPER GEMPRINT
Disk software that will transfer a Hscreen 1,2,3 or 4 picture screen to printer. Grey level shading for color.

Software Trio
$19.95
FREE
with purchase of any NX-1000 Printer

Price, availability and specifications subject to change without notice.

DAYTON ASSOCIATES of W.R. HALL, INC.
9644 QUAILWOOD TRAIL
SPRING VALLEY, OHIO 45370
OHIO RESIDENTS ADD 6% SALES TAX • C.O.D. ADD $2.00

PERSONAL SERVICE
(513) 885-5999
Visa & MasterCard
within the continental U.S.

protected disk and will run on any CoCo with at least 64K and one disk drive (although I recommend two drives). Be sure to specify which CoCo you have when you order (1, 2 or 3). A printer is also optional but *highly* recommended if you hope to use the full potential of this program. It comes with a 13-page manual that tells you everything you need to know. If for some reason you do run into a problem, you can call the author, Mike Forrest. I found him to be more than happy to help me, and within two days after the call I had an updated version in my mailbox. Now *that's* service!

(Forrest Enterprises, 6266 Melody Lane, #3074, Dallas, TX 75231, 214-369-5425; $25: First product review from this company appearing in THE RAINBOW)

— Bryan Gridley

Software CoCo 3

Disk Manager Tree — OS-9 File Management

Managing files on a disk with the limited file management utilities provided with OS-9 Level II is not an easy task — especially if you have a hard disk. The simple copy and delete commands do the job . . . one file at a time. But what if you want to copy or delete a number of files on a disk? Well, you could type the appropriate command over and over again, changing the filename each time, or you could use *Disk Manager Tree* from Alpha Software.

Disk Manager Tree is a file manipulation utility that runs under OS-9 Level II and makes excellent use of the windowing capability built into the operating system. The package is designed to work with standard floppy disk systems, hard disk systems and RAM disks. When you execute *DMT*, it scans the entire disk that is mounted in the specified device, say /d0, and displays the disk structure graphically. For my system disk, *DMT* displayed the following:

```
---/d0
|--CMDS
| |--ICONS
|--SYS
```

This tree structure is displayed in one of three windows. A second window is used to display the files in the selected directory, and the third window displays the various commands available and serves as a dialog box. From the main menu you can change to another directory or create and delete directories.

Using the up and down arrow keys you can select a subdirectory; by pressing the ENTER key you can display its list of files in Window 2. A submenu appears providing options to view, tag, copy and delete files. A file is selected by moving the up and down arrow keys and pressing the ENTER key to tag it. If you press C the file can be copied; pressing D deletes the file, and F1 allows you to view the file. When you view the file, a pop-up window appears and the file scrolls through the window.

Copying and deleting multiple files is a piece of cake with *DMT.* Simply move the arrow keys to the appropriate files and press ENTER to tag them. Once all the files have been tagged, simply press C or D. When copying, *DMT* prompts for the new directory; when deleting files, *DMT* asks if you are sure all of the tagged files should be deleted. If you agree, *DMT* proceeds to delete them.

DMT is a useful "workhorse" type program for managing the OS-9 disk system. Although I don't have a hard disk system, I can see that such a utility would be quite useful. I found the utility especially useful for rearranging files on floppy disks. Being able to select a number of files to be copied to other floppies really speeds up disk maintenance.

The only problem I found with *DMT*

The Ultimate Serial to Parallel Converter!
7 Switchable Baud Rates
300 • 600 • 1200 • 2400 • 4800 • 9600 • 19200
Use this "smart" cable to connect a Centronics parallel printer to any version CoCo or use it to improve performance of your current printer.
Try it on your system for 30 days RISK FREE. One year warranty.
4800
9600
19200
2400
1200
600
300
BLUE STREAK
ULTIMA
SERIAL TO PARALLEL INTERFACE
$39.95 +$2 Shipping

Color Super Gemprint
Print your Graphics Screens in Color on your NX-1000 Rainbow
Color Screen Dump Software
Use your favorite program to create a pmode or hi-res graphic image, but don't stop there! Run our color graphics software and print a color image using a pallette of 81+ colors on your NX-1000 Rainbow from a CoCo 1, 2, or 3. This system superimposes 4 graphic screen dumps (black, blue, yellow & red). The colors mix and add to give you your own color masterpiece.
System Requirements: 32k ECB Disk, Blue Streak 1, 2, 3 or Ultima
$19.95
FREE with purchase of NX-1000 Rainbow Printer
Price, specifications subject to change without notice.

DAYTON ASSOCIATES of W.R. HALL, INC.
9644 QUAILWOOD TRAIL
SPRING VALLEY, OHIO 45370
OHIO RESIDENTS ADD 6% SALES TAX • C.O.D. ADD $2.00

PERSONAL SERVICE
(513) 885-5999
Visa & MasterCard
within the continental U.S.

is in the View File option. Once a text file is selected for viewing, there is no way to terminate the listing other than by scrolling through the entire file. This is, of course, a major concern if you happen to choose a large file to view. I hope that Alpha Software will correct this in the next revision of the program.

I should also mention that *DMT* comes with an icon and instructions on how to include *DMT* in *Multi-Vue*. And, finally, *DMT* takes up about 70K of memory — which is not a problem on a 512K CoCo but might be for a 128K CoCo.

I strongly recommend *DMT* for new and advanced users to OS-9. It is an efficient and easy way to manage files. The program is very simple to use, has a good manual and an online help capability.

(Alpha Software Technologies, 2810 Buffon St., Chalmette, LA 70043, 504-279-1653; $29.95)

— Donald Dollberg

Software CoCo 1, 2 & 3

Shadow World — Adventures in Time

Shadow World is a text-only Adventure written for your 64K ECB Color Computer. It also runs fine on the CoCo 3. In *Shadow World*, your goal as a scientist is to find out why experimental lab animals have been dying as a result of time-travel experiments performed by a company that has stolen your time-travel formula.

This is a difficult Adventure to solve, but it is possible. The author has placed many items and locations in the game that are not necessary for the solution, and the result is a tough yet challenging Adventure.

As with most Adventures, this one also recognizes various abbreviated commands, such as `N` for north and `INV` for inventory. Your progress is best monitored with the use of a map, and provisions are made to save and reload a game using the standard `(C)SAVE` and `(C)LOAD` commands. A perfect score is 10, and I scored 8 — but only with the help of a solution sheet the author sent for the purpose of the review.

The game scenario is interesting and challenging. The only flaw I can see is that *Shadow World* is a text-only Adventure. Our CoCos are outstanding graphics computers, and this good Adventure could be a great one with graphics.

Shadow World is available on either tape or disk and is not copy-protected, so backup copies for your own protection is not a problem.

(Prodek Software, c/o Mike Snyder, Route 2, Box 81, Allen, OK 74825, 405-857-2852; $10.50 for tape, $12.50 for disk: First product review for this company appearing in THE RAINBOW.)

— Robert Gray

Software CoCo 1, 2 & 3

BASIC Screen Editor — Full-Screen Editing Capabilities

I learned BASIC by typing in listings from magazines. I started with plain BASIC, which meant erasing the line and typing it over (really tough on those 255-character packed lines). Then I expanded my CoCo with Extended Color BASIC and, bless Tandy, there was a line editor built-in. Now I could fix those typos with relative ease. Coincidentally, as my experience on the CoCo expanded, I also became a "professional" programmer and had access to a multitude of editors.

Most of these editors I used in my work allowed me to load in whole files to edit a full screen at a time. What a pleasure that was. Then I would come home to CoCo's humble line editor and wish for better things. Well, let me tell you, better things could be here.

BASIC Screen Editor by Douglas Pokorny and Gil Winograd takes the CoCo line editor one step further. It provides a full-screen editor especially for BASIC programs. It allows you to edit anything that appears on the screen — including direct commands.

BSE includes a short formatting program that must be run before using the editor the first time. It initializes and customizes the editor to your current CoCo setup and favorite features. Once you've set everything up, all you have to do is type `DOS` if your CoCo supports that command, else type `RUN"BSE"`. If you ever change your mind or your CoCo, just run the configuration program to change the initialization parameters.

What does *BSE* do for you? After the title screen, you don't even know it's there. So start typing in that great program you found in THE RAINBOW and run it. Oh, no, the dreaded SN Error! List the line in question and use the BASIC line editor to fix your typo. The normal Tandy editing commands are still active. What happened to the *BSE* program? Oh, it's still there, waiting for you to decide that you need a heavy-duty fixer.

List a bunch of lines. Say you want to customize the program with your own name in the `PRINT` statements. Great, just use the arrow keys to put the cursor over the word you want to change and type away. Press the arrow keys to get to the next change and type away again. If you hold down an arrow key for about a second, it starts auto-repeating. Slick, I can travel all over the screen with hardly a thought.

Here is a complete list of all the features of *BSE* and the keystrokes to generate them:

arrow keys	move cursor one character
BREAK	deletes character under the cursor
SHIFT-left arrow	backspaces
F1	recalls custom palette (CoCo 3)
F2	uses default CoCo 3 palette
CLEAR-@	erases screen
CLEAR-up arrow	puts caret on-screen
CLEAR-down arrow	toggles insert mode
CLEAR-left arrow	moves cursor to beginning of line
CLEAR-right arrow	moves cursor to end of line
CLEAR-BREAK	deletes from cursor to end of line
CLEAR-ENTER	splits the line at the cursor
SHIFT-@	toggles *BSE* on and off

The program is reset-proof, and other features include automatic lowercase-to-uppercase conversion, compatibility with the CoCo 1, 2 and 3, and compatibility with JDOS and ADOS. I'm using it with a 128K CoCo 3. It is written in position-independent machine language and comes on an unprotected disk.

The manual is eight pages of extremely readable text that fully explains the program's use and operation. It has plenty of examples and is written in fairly plain English so that even an inexperienced user should have no trouble understanding it. There were one or two minor typos, but I'm really fussy about manuals.

BSE performed as described with some minor problems. I couldn't get some of the shifted characters to autorepeat — strange things got printed on the screen (the distributor says this can't be fixed so they are going to put a notice in the manuals). Another point I am concerned with is that the program allows you to type in more characters on a BASIC line than the CoCo allows; this could present a minor retyping chore if you get carried away packing lines.

But on the other hand, no matter what I did, I couldn't get the program to have a major malfunction. In fact, I found it really neat to be able to re-execute command lines by just moving the cursor back to the beginning of the line (like a `DIR` command) and pressing ENTER. Another fun feature is the program's ability to recover programs after a `NEW` command. As long as it is on the screen, a line can be recovered by simply moving the cursor to the beginning of each line and pressing ENTER. Presto! Recovered code.

I would not call this program a full-featured editor because some features are missing that I would consider essential — like being able to scroll through the whole file and having cut-and-paste capabilities. Nonetheless, it has plenty of useful features that makes the CoCo easier to use. Given the reasonable price and the program's resident state, this looks like a good deal for all you BASIC programmers.

See Pg 34, Jul 88 RB for type-in pgm for same plus other features.

(Second City Software, P.O. Box 72956, Roselle, IL 60172, 312-653-5610; $19.95 plus $2.50 S/H)

— C.L. Pilipauskas

Software CoCo 3

Al-Write — CoCo 3 Editor/ Assembler

Al-Write is an editor/assembler written just for the CoCo 3. When the package first arrived, I was excited with the idea of a new tool for writing assembly programs that might allow me to retire my old super-patched *EDTASM+*, which has been modified to run on the CoCo 3.

Al-Write comes on one unprotected disk with a 57-page manual. The disk may be backed up with the `BACKUP` command; in fact, this is the only way a working copy can be made because the program makes use of the command `DOS` for starting the program. Do not just copy the files! Instructions for this should have been included in the manual. Backing up your master disk is always important — but especially so when working with assembly language.

SPECIAL EVENT!

COCO GALLERY LIVE
SHOWCASE YOUR BEST AT RAINBOWFEST

We are taking the popular "CoCo Gallery" on the road to RAINBOWfest Princeton — and we'd like you t submit your own graphics creations to be exhibited at the show!

RULES

- You can enter color or black-and-white photographs or printouts of your original artwork produced on the CoCo 1, 2 or 3. Entries must be framed, mounted or matted, and may not be smaller than 5-by-7 inches or larger than 11-by-14 inches.
- Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is ***not*** an original work.
- Along with your entry, send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.). Please include a few facts about yourself, too!
- Your name, address and phone number, along with the title of your work, must be clearly marked on the back of each entry, and a disk copy of each piece must also be included.
- Entries must be mailed to THE RAINBOW before October 10, 1988, or brought to the RAINBOWfest registration booth by 10 a.m., Saturday, October 22.
- All entries to CoCo Gallery Live become the property of Falsoft, Inc.

There will be two categories: one for graphics produced on the CoCo 1 and 2, and one for CoCo 3 graphics. Several awards will be made in each category. Winners will be determined by votes from RAINBOWfest attendees. In case of any ties, winners will be determined by our chief judge, CoCo Cat.

Prizes and ribbons will be presented Sunday, October 23, 1988, and winning entries will be published in the February '89 issue of THE RAINBOW. Send your entry to "CoCo Gallery Live," THE RAINBOW, 9509 U.S. Highway 42, Prospect, KY 40059.

RAINBOW
FEST®
PRINCETON
OCT. 21-23

RAINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer. Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time. Princeton is the show** to get information on capabilities for the new CoCo 3, along with a terrific selection of the latest CoCo 3 software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

A special feature of RAINBOWfest is the **Educational Sandbox,** which features **child-oriented workshops** to give hands-on experience to an age group often neglected. There are sessions for the kindergarten through third-graders, and for fourth- through seventh-graders. And, as an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

If you missed the fun at our last RAINBOWfest in Chicago, why don't you make plans now to join us in Princeton? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Princeton area.

The Hyatt Regency Princeton offers special rates for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 3 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

BE THERE!

FREE SEMINARS

Cray Augsburg
RAINBOW Technical Editor
OS-9 For Absolute Beginners

Bruce K. Bell, O.D.
Two-time Grand Prize Winner of RAINBOW's Adventure Contest
Writing Adventure Games

Steve Bjork
SRB Software
Writing Game Software

Chris Burke
Burke & Burke
Hard Drive Systems

Ben Burnette
Wayne Smith
CY-BURNET-ICS
CoCo as an Educational Tool

Nancy Ewart
Independent Programmer
Starting with C

Marty Goodman, M.D.
RAINBOW Contributing Editor
Two CoCo Consultations Live

Paul Hodash
Delphi-Information Product Supervisor
Telecommunications

Cecil Houk
Rulaford Research
Music and MIDI

Jutta Kapfhammer
RAINBOW Managing Editor
Writing for Publication

Dale Puckett
RAINBOW Contributing Editor
Overview of OS-9
Overview of BASIC09

Ed Samuels
New York Law School
Copyright Laws

Logan Ward
Computer Center
CoCo Cartooning

COCO COMMUNITY BREAKFAST

Dick White — RAINBOW Contributing Editor

Our keynote speaker for the traditional CoCo Community Breakfast is Dick White, contributing editor for THE RAINBOW. Mr. White, who has a long background with microcomputers, will discuss his personal experiences in the early years as he traces the development of the Color Computer since its introduction in 1980.

SPECIAL EVENT!

We're pleased to present The Educational Sandbox, a joint Tandy/RAINBOW effort. This is a computer workshop for RAINBOWfest kids. There will be two sessions on both Saturday and Sunday. One workshop will be for the kindergarten through third-grade set, and the other for fourth- through seventh-graders. Each workshop will last between 45 minutes and one hour, and will give the children and their parents hands-on experience in using Tandy computers and software.

RAINBOWfest - Princeton, New Jersey
Dates: October 21-23, 1988
Hotel: Hyatt Regency Princeton
Rooms: $88 per night, single or double
Advance Ticket Deadline: Oct. 7, 1988

RAINBOWfest - Chicago, Illinois
Dates: April 14-16, 1989
Hotel: Hyatt Regency Woodfield
Rooms: $66 per night, single or double
Advance Ticket Deadline: March 31, 1989

FREE T-Shirt to first five ticket orders received from each state.

First 500 ticket orders received get *The Rainbow Book of Simulations*.

YES, I'm coming to **Princeton!** I want to save by buying tickets now at the special advance sale price. Breakfast tickets require advance reservations.

Please send me:

_____ Three-day ticket(s) at $9 each total _____
_____ One-day ticket(s) at $7 each total _____
Circle one: Friday Saturday Sunday
_____ Saturday CoCo Breakfast at $12 each total _____
_____ RAINBOWfest T-shirt(s) at $6 each total _____
Specify size:
_____ S _____ M _____ L _____ XL
(T-shirts must be picked up at the door)
Handling Charge $1 _____
TOTAL ENCLOSED _____
(U.S. Currency Only, Please)
☐ Also send me a hotel reservation card for the Hyatt Regency Princeton ($88, single or double room).

Name (please print) _____
Address _____
City _____ State _____
Telephone _____ ZIP _____
Company _____
☐ Payment Enclosed, or Charge to:
☐ VISA ☐ MasterCard ☐ American Express
Account Number _____
Exp. Date _____
Signature _____

Advance ticket deadline: October 7, 1988. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

Several times while I was running *Al-Write* the disk did a self-destruct.

Al-Write will run only on a CoCo 3 using Disk BASIC 1.1 and one or more disk drives. If you are not sure which version you have, look at the start-up logo when you first turn your computer on. It should read Disk Extended Color BASIC 2.1; if it reads 2.0, you have Disk BASIC 1.0.

First I tried to run the program on my 512K CoCo 3 and was presented with a blank screen and blinking cursor. Since I also have 128K CoCo 3s for the kids, I took command and used them for testing. I had a few problems with *Al-Write*, but a request for help brought a new disk with Version 1.1 and additional information not in the manual. Because almost any new product is likely to have bugs, I expect the manual may be updated by the time you read this. The new 1.1 version also fixed the ghosting bug and works with 512K.

When you type `DOS` you are presented with the copyright notice; pressing any key will put you in the main menu. From here your first option is Edit, which will put you in a BASIC full-screen editor that can support 32- or 40-column screens. While the 80-column screen is not supported, most programmers should find the 40-column screen satisfactory. The colors used in the display (black, white and green) are compatible with any type of monitor or TV.

While the manual is sizable, I must take exception to some of the terms used and other inaccurate information that it contained. More about using *Al-Write* and some of its excellent features would be a real help. An index would have helped greatly in locating needed information. Very important instructions for using *Al-Write* were missing or hard to find.

From the menu you can view your disk directory in a neat two-column format; load or save your source file; assemble code; run assembled code; quit *Al-Write* or select the Options menu. You must use the Options menu to name your binary/object code disk file. When you load or save your source text file you are prompted for a filename. In the Options menu you can select screen or printer output for your assembly listing.

No method is provided for listing your text file to a printer! The Options menu lets you set a default origin for your assembled program, but it must reside totally in the range of $6000 to $7FFF, which is fine for some applications. You may also use the origin directive in your source code, but only one `ORG` is allowed.

Another stated limitation is that the assembled program must not "handle" memory outside the $6000 to $7FFF range if it is to run within the *Al-Write* environment. This eliminates the ability to access any graphics or text screens, system registers, BASIC hooks in low memory, etc. Some utilities published in THE RAINBOW require access to these memory areas. This also means you cannot take advantage of the extended memory of the CoCo 3 system within *Al-Write*. But programmers *can* write and assemble a program anywhere in memory with *Al-Write*, then load and execute it from BASIC.

`SAMPLE.ASM` is a text file you can test the assembler with. Several times I was greeted by an unknown system error even with the sample. If you do get this error you must turn your CoCo 3 off and then on to recover, even if it was run from *Al-Write*'s menu. The start label is not supported and is not allowed, but you can use any other valid label name to specify the execution point in your program. To do this you follow the `END` statement with the label you have chosen; if you fail to do this the program will crash the system when you try to run it. *Al-Write* uses a default execute address of $000 unless you specify the address directly or with a label in the `END` statement.

One feature I really like is the ability to write subroutine source code and save it in a disk file — thus you can build yourself a subroutine library. The subroutines may then be added to your main program using the Include function; this can save a lot of typing or reinventing of the wheel, so to speak. The Include feature works very well. While assembling the source code, it loads in and includes (merges) source text from disk files. Includes may not be nested. There's no need to worry about conflicting line numbers because *Al-Write* does not need or use them.

Al-Write follows some predefined conventions for register usage allowing easy parameter passing. Parameter passing is well-explained in the manual, which provided examples. *Al-Write* does allow you to do a trial assembly; the program assembles your text, listing errors found while assembling your source file. *Al-Write* does provide error messages, but it usually overprints the line with the error. Normally when the assembler encounters an error the assembly process is aborted and you are returned to the editor, but this may be overridden with the NoEdit directive. Other directives include List/NoList, CLS (clear the screen) and Wait, which will stop and wait for a key press before continuing during assembly.

Well, if you are a person who reads only the last paragraph of a review, here is mine in a CoCo-nutshell. While *Al-Write* has some excellent features, its limitations preclude it for many practical uses. If the memory location and access restrictions within the environment could be eliminated, *Al-Write* could set a new standard for assembly language programming under Disk BASIC. *Al-Write* will run on any CoCo 3 with Disk BASIC 1.1. Though the manual was sizable, some very important information was either missing or hard to find. While I had problems at first getting *Al-Write* to work as expected, I received a quick response from the author, a new version with bugs fixed and additional information not in the manual.

(Daniel Jimenez, P.O. Box 4967, San Antonio, TX 78285, 512-690-1788; $30: First product review from this company appearing in THE RAINBOW)

— J.D. Walker

Software CoCo 3

Word Power 3.1 — 80 Columns and Windows, Too

After using *VIP Writer* with my CoCo 2 and a composite monitor for several years, I looked forward to viewing an 80-column screen with the CoCo 3. But I was greatly disappointed at the lack of good "friendly" word processing software that followed. I tried two systems advertised in RAINBOW, but they failed to meet my requirements — versatility and the KISS factor (Keep It Simple, Stupid).

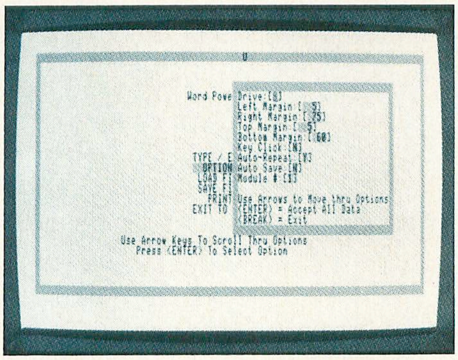
So I continued using *VIP* with its 64-column window until Microcom came out with *Word Power* 3. The first version of the system had a few bugs, but it showed great promise. Through close coordination and cooperation with those who recognized this promise, Microcom now offers CoCoists a very useful system that is *fun* and a joy to use.

Before going into a detailed review of this system, I would like to point out that I am impressed with the software development capability of Microcom.

After I received the initial version and noted a few problems, I received their 3.1 version, which took care of these problems and included many other enhancements. I called to express my thanks and was told that they plan to revise the program as necessary to make it more responsive to the needs of the public based on recommendations and to provide previous customers updated versions for cost and handling. This is *real* PR!

One of the most impressive things about this word processor is that it was developed for the CoCo 3 from scratch and, unlike other word processors, is not "patchwork." This makes it more sufficient in fully utilizing the versatile capabilities of the CoCo 3. Written in machine language and operating in the double-speed mode, it has amazing execution speed and enables very fast screen reformatting. Also, *Word Power* 3.1 is not copy-protected, which means you can make copies for your own use.

The system's ease of learning really impressed me. Memorizing the key commands is a snap because most follow a logical pattern, and the system employs an effective use of colorful windows. It is much easier to use than the *VIP* software and two other CoCo 3 word processing systems I had tried. Even *WordStar,* which I use in my work, is nightmarish in comparison with *Word Power* 3.1.



```
                         U

        Word Powe Drive:[0]
                  Left Margin:[ 5]
                  Right Margin:[ 75]
                  Top Margin:[ 5]
                  Bottom Margin:[ 60]
                  Key Click:[N]
         TYPE / E Auto-Repeat:[Y]
           OPTION Auto Save:[N]
          LOAD FI Module #:[1]
          SAVE FI
            PRINT Use Arrows to Move thru Options
          EXIT TO <ENTER> = Accept All Data
                  <BREAK> = Exit

    Use Arrow Keys To Scroll Thru Options
      Press <ENTER> To Select Option
```

The first requirement in using *Word Power* is running the program `SETUP`, which establishes your defaults, some of which can be changed while typing and editing.

When you run `SETUP`, the first thing you see is the main menu:

1. Set Colors
2. Set Parameters
3. Set Printer Codes
4. Save Setup File

Word Power 3.1 opens beautiful horizons of colors that you pick out yourself, and you can change them if you tire of a particular set. I have an RGB color monitor, and I use a beautiful sky blue background with black letters when I am in the edit mode, and my linefeed symbols are purple. In the window mode I have a red border with an amber background on the inside. There are many colors and combinations from which to choose. If you have a monochrome monitor, you still go through the color selection routine to get the "mix" that appeals to you.

When selecting parameters you are asked whether you want a key-click, automatic key repeat and automatic saving (which is *great* in my case, because I live in "the lightning capital of the world," which seasonally experiences frequent power disruptions). I set my left and right margins at 1 and 79, respectively, so that I can see as much as possible on the screen without scrolling to the right. But before printing I change the margins to give me a 1-inch border.

After entering your default parameters, you need to enter the various codes

BOWLING LEAGUE SECRETARY ©1986

RAINBOW
CERTIFICATION
SEAL

Reviewed
Sept. 1986 pg 141
April 1987 pg 140

Now for the Co-Co 1, 2 or 3 with disc drive, printer, 32K.

- User friendly—full menu driven selections.
- Any number of teams, and over 200 bowlers.
- Calculates and stores all team and bowlers stats.
- Men, women, mixed, scratch or handicap; blinds and substitutes.
- Start up any time in season.
- Full edit capability.
- Automatic backups and weekly, mid-season and end-season resets.
- ABC/WIBC style printouts.
- Includes 20-page instruction manual.
- Upgrade for individual tally sheets. ($9.95 separate; free when ordered with program.)

Priced at **$49.95** including Shipping, Handling & Sales Tax. To order, send check or M.O.

Specify Version number (1.0 for men or women; 1.1 for mixed) and number of disc drives.

TOMELA*CO
P.O. Box 2162 • Doylestown, Pa. 18901-2162 • (215) 348-5822

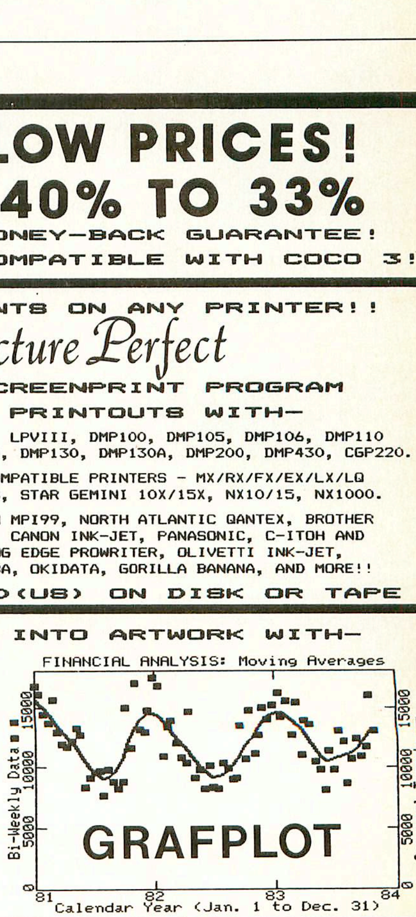
NEW, LOW PRICES!
SAVE 40% TO 33%
RAINBOW CERTIFICATION SEAL
MONEY-BACK GUARANTEE!
COMPATIBLE WITH COCO 3!

SCREENPRINTS ON ANY PRINTER!!
Picture Perfect
GRAPHIC SCREENPRINT PROGRAM
FULL-PAGE PRINTOUTS WITH—
RADIO SHACK: LPVII, LPVIII, DMP100, DMP105, DMP106, DMP110 DMP120, DMP130, DMP130A, DMP200, DMP430, CGP220.
EPSON/IBM: ALL COMPATIBLE PRINTERS - MX/RX/FX/EX/LX/LQ SERIES, STAR GEMINI 10X/15X, NX10/15, NX1000.
AND: ZENITH MPI99, NORTH ATLANTIC QANTEX, BROTHER DM-40, CANON INK-JET, PANASONIC, C-ITOH AND LEADING EDGE PROWRITER, OLIVETTI INK-JET, TOSHIBA, OKIDATA, GORILLA BANANA, AND MORE!!
ONLY $15.00(US) ON DISK OR TAPE

TURN DATA INTO ARTWORK WITH—
LOADS SPREADSHEETS
AUTO SCALES & LABELS
SMOOTHS & INTEGRATES
291 GRAPHING SYMBOLS
UNLIMITED OVERLAYS
STORE COMPLETE GRAPHS
MANUAL & TUTORIAL

SPECIFY PRINTER WITH YOUR ORDER!

TAPE: $25.00 (US)
DISK: $30.00 (US)



SEND CHECK OR MONEY ORDER TO:
HAWKES RESEARCH SERVICES: 859 STANFORD AVE, OAKLAND, CA 94608
FOR INFORMATION - (415) 547-7557. SHIPMENT WITHIN 48 HOURS!
ADD $3.00 SHIPPING ON ALL ORDERS. CA. RESIDENTS ADD SALES TAX

T & D SUBSCRIPTION SOFTWARE CELEBRATES 6 YEARS

ISSUE #1, JULY 1982
COVER 1
RACE TRACK
HANGMAN
MUSIC ALBUM
LIFE EXPECTANCY
WORD TESTS
KILLER MANSION
BARTENDER
CALENDAR
ROBOT WAR

ISSUE #2, AUG. 1982
UFO COVER PT. 1
BIORYTHM
BOMBARDMENT
BLACK JACK
COST OF LIVING
FRENZY
BUSINESS LETTER
QUICK THINK
QUEST INSTRUCTIONS
QUEST FOR LENORE

ISSUE #3, SEPT. 1982
UFO COVER PT.2
BASKETBALL
CHUCKLUCK
SLOT MACHINE
ALPHABETIZER
NFL PREDICTIONS
FLAG CAPTURE
ROBOT BOMBER

ISSUE #4, OCT. 1982
UFO RESCUE
TANK BATTLE
DRIVEWAY
SOUNDS
BALLOON DROP
MIND BOGGLE
COCO-TERRESTRIAL ADV.
CALORIE COUNTER
JACK-O-LANTERN

ISSUE #5, NOV. 1982
CATALOG COVER
BOWLING
PROGRAM INVENTORY
PROMISSORY-LOANS
CHECKBOOK BALANCER
TRIGONOMETRY TUTOR
CONVOY
BAG-IT
SPECTRA SOUND
CONVEYOR BELT

ISSUE #6, DEC. 1982
CHRISTMAS COVER
RAINDROPS
STOCK MARKET
ADVANCE PONG
DESTROY
SOUND ANALYZER
CREATIVITY TEST
VOICE DATA
ML TUTORIAL PT.1
LOONY LANDER

ISSUE #7, JAN. 1983
NEW YEARS COVER
LIST ENHANCER
SUPER PRECISION DIV.
BOMB DIFFUSE
SPACE STATION
ML TUTORIAL PT. 2
SHOOT OUT
FIND UTILITY
CYBORG INS.
CYBORG FACES

ISSUE #8, FEB., 1983
COVER 8
DEFEND
3 DIMENSIONAL MAZE
COCO CONCENTRATION
AUTO LINE NUMBERING
ML TUTORIAL PT.3A
ML TUTORIAL PT.3B
NUCLEAR POWER PLANT
DUAL BARRIER
BRICKS

ISSUE #9, MARCH 1983
TIME MACHINE COVER
TRIG DEMO
PYRAMID OF CHEOPS
PROGRAM PACKER
BUDGET
ELECTRONIC DATE BOOK
ML TUTORIAL PT.4
TAPE DIRECTORY
BLOCK-STIR
COCO ADDING MACHINE

ISSUE #10, APRIL 1983
TENTH COVER
PYRAMID OF DANGER
TYPING TUTOR
ML TUTORIAL PT.5
TINYCALC
STOCK MARKET COMP
YAH-HOO
MISSILE ATTACK
SCREEN PRINT
BRIKPONG

ISSUE #11, MAY 1983
ELEVENTH COVER
ARCHERY
FROG JUMP
ML TUTORIAL PT.6
MLT DICTIONARY
BASIC SPEED UP TOT.
METRIC CONVERTOR
GRAPHIC QUAD ANTENNA
GRAPHICS PROGRAM
CATERPILLAR CAVE

ISSUE #12, JUNE 1983
TWELFTH COVER
SHOOTING GALLERY
BOMB STOPPER
VALLEY BOMBER
STAR FIGHTER
WHEEL OF FORTUNE
ML TUTORIAL PT.7
MERGE UTILITY
RAM TEST
LANDER

ISSUE #13, JULY 1983
THIRTEENTH COVER
FLASH CARD
ICE BLOCK
COSMIC FORTRESS
MAIL LIST
DOLLARS & CENTS
ML TUTORIAL PT.8
SDSK COPY
MUSIC SYNTHESIZER
CRAWLER

ISSUE #14, AUG. 1983
MYSTERY COVER
ROW BOAT
COMPUTER TUTL PT. 1
INDEX DATA BASE
DISK ZAPPER
COCO-MONITOR
COCO-ARTIST
ROBOT COMMAND
TEST SCREEN PRINT
HIGH RESOLUTION TEXT

ISSUE #15, SEPT. 1983
MYSTERY COVER PT.2
GOLD VALUES
TREK INSTRUCTIONS
TREK
HIGH TEXT MODIFICATION
ASTRO DODGE
DR. COCO
PEG JUMP
MORSE CODE
PURGE UTILITY

ISSUE #16, OCT. 1983
MYSTERY COVER
BOPOTRON
DIRECTORY RECALL
VECTOR GRAPHICS INST.
VECTOR GRAPHICS
SKYDIVER
SWERVE AND DODGE
NIMBO BATTLE
TAPE ANALYSIS UTILITY
LIFE GENERATIONS

ISSUE #17, NOV. 1983
THANKSGIVING COVER
3-D TIC-TAC-TOE
INDY 500
COLLEGE ADVENTURE
MEMORY GAME
DUNGEON MASTER
WEATHER FORECASTER
GRID FACTOR INST.
GRID FACTOR
DRAW

ISSUE #18, DEC. 1983
CHRISTMAS COVER
CLIMBER
GALACTIC CONQUEST
WARLORDS
STATES REVIEW
MATH TUTOR
MACHINE LANGUAGE DATA
PRINTER UTILITY INST.
PRINTER UTILITY
MUTANT WAFFLES

ISSUE #19, JAN. 1984
BANNER
PROBE
DISK DIR. PROTECTOR
OPTICAL CONFUSION
WORD PROCESSOR
WORD SEARCH
ASTRONAUT RESCUE
STAR TRAP
PIE CHART
FORCE FIELD

ISSUE #20, FEB. 1984
INTRODUCTION
HINTS FOR YOUR COCO
ESCAPE ADVENTURE
SEEKERS
MASTER BRAIN
LIST CONTROLLER
DISKETTE CERTIFIER
ROM COPY
BASIC RAM
SNAFUS

ISSUE #21, MAR. 1984
BASIC CONVERSIONS
FINANCIAL ADVISE
CASTLE STORM
DOS HEAD CLEANER
COCO TERMINAL
SNAKE CRAWLER
WAR CASTLE
SKY FIRE
EASY BASIC
DOTS 3-D

ISSUE #22, APRIL 1984
HEALTH HINTS
GLIBLIBS
CLOTHER SLITHER
BIBLE 1 & 2
BIBLE 3 & 4
CATCH ALL
INVADER
ALIEN RAID
MOON ROVER
IO ERROR IGNORER

ISSUE #23, MAY 1984
MONEY SAVERS 1 & 2
STOCKS OR BOMBS
WALL AROUND
COCO TECHNICAL LOOK PT.1
NUCLEAR WAR INST.
THERMONUCLEAR WAR
CIRCUIT BREAKER
MOUSE RACES
SUPER SQUEEZE
DATA FALL

ISSUE #24, JUNE 1984
DIR PACK & SORT
BRICK OUT
COCO TECHNICAL LOOK PT. 2
USA SLIDE PUZZLE
51 *24 SCREEN EDITOR
51 *24 SCREEN EDITOR
CITY INVADERS
PRINTER SPOOLER
STEPS
SNAKE

ISSUE #25, JULY 1984
CLOCK
COCO TECHNICAL LOOK PT.3
SKID ROW ADVENTURE
MONEY MAKER
PIN-HEAD CLEANING
LINE EDITOR INST.
LINE EDITOR
BOOMERANG
BUBBLE BUSTER
ROCOCHET

ISSUE #26, AUG. 1984
PEEK POKE & EXECUTE
SAUCER RESCUE
YOUNG TYPER TUTOR
O-TEL-O
OLYMPIC EVENTS
DOUBLE DICE
COCO DATABASE
BATTLE STAR
COCO-PIN BALL
MONTEZUMAS DUNGEONS

ISSUE #27, SEPT. 1984
COCO TO COM 64
GALACTIC SMUGGLER
INDY RACE
ACCOUNT MANAGER
CASSETTE MERGE UTILITY
STRING PACKING TUTORIAL
SPACE DUEL
BUGS
TRAP-BALL
BALLOON FIRE

ISSUE #28, OCT. 1984
HANGING TREE
CHECKERS
FOOTBALL
MORE PEEKS & POKES
SPELLING CHECKER
SOUND DEVELOPMENT
WORD GAME
SCREEN REVERSE
AUTO COPY
RAT ATTACK

ISSUE #29, NOV. 1984
DISK ROLL OUT
ROBOT ON
MULTIPONG
ADVENTURE GENERATOR
QUEST ADVENTURE
QUARTER BOUNCE
DUAL OUTPUT
KEY REPEAT
FULL EDITOR
METEOR

ISSUE #30, DEC. 1984
MATH HELP
ZECTOR ADVENTURE
WORLD CONQUEST
DRAG RACE
MINE FIELD
T-NOTES TUTORIAL
T & D PROGRAM INDEXER
SYSTEM STATUS
ERROR TRAP
DROLL ATTACK

ISSUE #31, JAN. 1985
TREASURES OF BARSOOM
BATTLEGROUND
STRUCT. COMPILED LANG.
MINIATURE GOLF
STAR DUEL
ARITHMETIC FOOTBALL
GRID RUN
SPIRAL ATTACK
FAST SORT
MUNCHMAN

ISSUE #32, FEB. 1985
DR. SIGMUND
ICE WORLD ADVENTURE
LOTTERY ANALYST
BASIC *COMPILER*
MUSIC CREATOR
MEANIE PATROL
TRI-COLOR CARDS
SHAPE RECOGNITION
DISK BACKUP
SPACE PROTECTOR

ISSUE #33, MAR. 1985
LIGHT CYCLE
PAINT
SKEET SHOOTING
GUITAR NOTES
MI DISK ANALYZER
PERSONAL DIRECTORY
NAUGHA ADVENTURE
EGGS GAME
DISK DIRECTORY PRINT
SPEED KEy

ISSUE #34, APRIL 1985
HOVER TANK
POWER SWORD
TERMITE INVASION
SPELLING CHECKER
DOS BOSS
NINE CARD CHOICE
MUSIC GENERATOR
FYR-DRACA
DRIVE TEST
GRAPHIC TOUR

ISSUE #35, MAY 1985
SELECT A GAME 1
TAPE PROBLEMS
STROLL TRIVIA
SOFTBALL MANAGER
FONTS DEMO
CLOWN DUNK MATH
ALPHA MISSION
DOS ENHANCER
KNOCK OUT
HAUNTED HOUSE

ISSUE #36, JUNE 1985
SELECT A GAME 2
VIDEO COMPUTER
SPEECH SYNTHESIS
SPEECH RECOGNITION
SPACE LAB
AUTO COMMAND
COMPUTER MATCHMAKER
KNIGHT & THE LABYRINTH
STAR SIEGE
TALKING SPELLING QUIZ

VISA

MasterCard

SUPER SAVINGS
Single Issue $8.00
2-5 Issues .... $6.00 ea.
6-10 ISSUES .... $5.00 ea.
11 or more Issues . $4.50 ea.
All 72 Issues $199.00
Purchase 20 or more issues and receive a free 6 month subscription.

- Every Issue Contains 10 or More Programs
- Many Machine Language Programs
- Available for COCO I, II and III
- All Programs Include Documentation

- We send 1st Class No Charge
- Personal Checks Welcome!

RAINBOW
CERTIFICATION
SEAL

AND OVER 720 PROGRAMS WITH A BACK ISSUE SALE!

ISSUE #37, JULY 1985
- CHESS MASTER
- BIBLE 5-7
- SHIP WREK ADVENTURE
- FILE TRANSFER
- FOUR IN A ROW
- MARSHY
- TAPE CONTROLLER
- CATACOMB
- AUTO TALK
- SGR8PAK

ISSUE #38, AUG. 1985
- GOLF PAR3
- WIZARD ADVENTURE
- KITE DESIGN
- ROBOTS
- GOMOKU
- AMULET OF POWER
- LINE COPY UTILITY
- DISK PLUMBER
- SUPER RAM CHECKER
- GRAPHIC HORSE RACE

ISSUE #39, SEPT. 1985
- DRUNK DRIVING
- CAR MANAGER
- SQUEEZE PLAY
- SUPER BACKUP
- RECIPE MACHINE
- ANTI-AIRCRAFT
- UNREASON ADVENTURE
- TALKING ALPHABET
- SUPER VADERS
- AUTOMATIC EDITOR

ISSUE #40, OCT. 1985
- STAR TREK
- HAM RADIO LOG
- COCO WAR
- DISK LABELER
- SHIP WAR
- ELECTRIC COST
- MULTIKEY BUFFER
- NUKE AVENGER
- CURSOR KING
- SAND ROVER

ISSUE #41, NOV. 1985
- GRUMPS
- DISK DRIVE SPEED TEST
- SOLAR CONQUEST
- GAS COST
- RIME WORLD MISSION
- WUMPUS
- CHARACTER EDITOR
- GRAPHIC TEST
- GRAPHIC LOOPY
- BOLD PRINT

ISSUE #42, DEC. 1985
- HOME PRODUCT EVALUATION
- YAHTZEE
- DISK UTILITY
- MACH II
- ELECTRONIC BILLBOARD
- CAR CHASE
- SUPER MANSION ADVENTURE
- SLOT MACHINE GIVE AWAY
- TEXT BUFFER
- TUNNEL RUN

ISSUE #43, JAN. 1986
- DUELING CANNONS
- WATER COST
- ZIGMA EXPERIMENT
- MUSICAL CHORDS
- SAFE PASSAGE
- PASSWORD SCRAMBLER
- GUNFIGHT
- KEYPAD ENTRY
- STYX GAME
- PRINTER DIVERT

ISSUE #44, FEB. 1986
- HOME INVENTORY
- NINE BALL
- PRINTER REVIEW
- EXPLORER ADVENTURE
- SPANISH LESSONS
- CROSS FIRE
- RAM SAVER
- GRAY LADY
- JOYSTICK INPUT
- COSMIC SWEEPER

ISSUE #45, MAR. 1986
- INCOME PROPERTY MGMT.
- ELECTRONIC BILLBOARD 2
- MOUNTAIN BATTLE
- THE FIGHT
- COCO KEENO
- HOCKEY
- LOGICAL PATTERNS
- ON SCALE SCREEN
- LIBERTY SHIP
- SINGLE STEP RUN

ISSUE #46, APRIL 1986
- SPECIAL EVENTS REMINDER
- DISK LOCK
- SMALL BUSINESS MANAGER
- BOMB RUN
- TANKS
- TAR PITS
- BASEBALL
- NUMBER RELATIONSHIPS
- ROULETTE
- GLOBAL EDITOR

ISSUE #47, MAY 1986
- CHRISTMAS LIST
- BLACK HOLE
- PITCHING MANAGER
- SYMBOLIC DIFF.
- BUG SPRAY
- OWARE CAPTURE
- EASY GRAPHICS
- DESERT JOURNEY
- SCREEN CONTROL
- FULL ERROR MESSAGE

ISSUE #48, JUNE 1986
- CHESTER
- TV SCHEDULE
- BASE RACE
- ROMAN NUMERALS
- ASTRO DODGE
- HIRED AND FIRED
- MULTI COPY
- AUTO MATE
- SCROLL PROJECT
- NOISE GENERATOR

ISSUE #49, JULY 1986
- COMPUTER I.O.U.
- DISK DISASSEMBLER
- BAKCHEK
- PACHINKO
- STOCK CHARTING
- HAUNTED STAIRCASE
- CANYON BOMBERS
- DRAGONS 1 & 2
- GRAPHIC SCROLL ROUTINE
- AUTO BORDER

ISSUE #50, AUG. 1986
- BUSINESS INVENTORY
- D & D ARENA
- DISK CLERK
- PC SURVEY
- TREASURE HUNT
- SCREEN GENERATOR
- ASTRO SMASH
- NFL SCORES
- BARN STORMING
- SMASH GAME

ISSUE #51, SEPT. 1986
- ASSET MANAGER
- MONEY CHASE
- FISHING CONTEST
- RIP OFF
- HAND OFF
- BUDGET 51
- VAN GAR
- DOS EMULATOR
- MEM DISK
- VARIABLE REFERENCE

ISSUE #52, OCT. 1986
- ACCOUNTS RECEIVABLE
- WORKMATE SERIES
- CALENDAR
- INVASION
- THE TRIP ADVENTURE
- FOOT RACE
- FLIPPY THE SEAL
- SCREEN CALCULATOR
- ABLE BUILDERS
- SUPER ERROR2

ISSUE #53, NOV. 1986
- CORE KILL
- LUCKY MONEY
- COOKIES ADVENTURE
- NICE LIST
- SPANISH QUIZZES
- PAINT EDITOR
- CARVERN CRUISER
- SNAP SHOT
- MEGA RACE
- KICK GUY

ISSUE #54, DEC. 1986
- JOB LOG
- PEGS
- DIGITAL SAMPLING
- JUNGLE ADVENTURE
- PAINT COCO 3
- CONVERT 3
- COMPUTER TYPE
- PANZER TANKS
- MRS PAC
- BIG NUM

ISSUE #55, JAN. 1987
- GRADE BOOK
- MAIL LIST
- DOWN HILL
- FIRE FOX
- JETS CONTROL
- GALLOWS
- DIR MANAGER
- FIRE RUNNER
- GRAPHICS BORDER
- COSMIC RAYS

ISSUE #56, FEB. 1987
- CALENDAR PRINT
- CRUSH
- GALACTA
- OCEAN DIVER
- CLUE SUSPECT
- WORD EDITOR
- ALIEN HUNT
- DEMON'S CASTLE
- PICTURE DRAW
- DIG

ISSUE #57, MAR. 1987
- THE BAKERY
- ENCHANGED VALLEY ADV.
- SAFE KEEPER
- WAR 1
- BOMB DISABLE
- PIANO PLAYER
- SPREAD SHEET
- SLOT MANEUVER
- LIVING MAZE
- GEM SEARCH

ISSUE #58, APRIL 1987
- ACCOUNTS PAYABLE
- PRINTER GRAPHICS
- SIMON
- PANELING HELPER
- MULTI CAKES
- CAR RACE
- ELECTRONICS I
- BATTLE TANK
- DISKETTE VERIFY
- WEIRDO

ISSUE #59, MAY 1987
- GENEOLOGY
- HOME PLANT SELECTION
- CHECK WRITER
- HELIRESCUE
- KABOOM
- NEW PONG
- CROQUET
- FUNCTION KEYS
- ZOOM
- ELECTRONICS 2

ISSUE #60, JUNE 1987
- JOB COSTING
- LABELS
- CATCH A CAKE
- COCO MATCH
- ROBOTS
- STREET RACERS
- BOWLING 3
- ELECTRONICS 3
- GRAFIX
- KRON

ISSUE #61, JULY 1987
- EZ ORDER
- SUBMISSION WRITER
- KEYS ADVENTURE
- WALLPAPER
- CHOPPER COMMAND
- UNDERSTANDING OPPOSITES
- BIT CODE PLOTTING
- ELECTRONICS 4
- KING PEDE
- RAIDER

ISSUE #62, AUG. 1987
- PENSION MANAGEMENT
- HERB GROWING
- CATOLOGER UTILITY
- RAIDERS
- ALPHABETIZING
- U.F.O.
- ELECTRONICS 5
- RAMBO ADVENTURE
- BLOCKS
- MULTI SCREEN CAVES

ISSUE #63, SEPT. 1987
- GENEOLOGIST HELPER
- SMART COPY
- MAINTENANCE REPORTING
- COCO3-COCO 2 HELPER
- DIRECTORY PICTURE
- SUB ATTACK
- SAVE THE MAIDEN
- CAVIATOR
- ELECTRONICS 6
- MONKEY SHINE

ISSUE #64, OCT. 1987
- GARDEN PLANTS
- FORT KNOX
- ELECTRONICS FORMULAS
- SNAKE IN THE GRASS
- CYCLE JUMP
- GEOMETRY TUTOR
- WIZARD
- GAME OF LIFE
- ELECTRONICS 7
- FLIGHT SIMULATOR

ISSUE #65, NOV. 1987
- TAXMAN
- DAISY WHEEL PICTURES
- CHILDSTONE ADVENTURE
- SIR EGGBERT
- CROWN QUEST
- GYM KHANA
- COCO 3 DRAWER
- FOOTBALL
- ELECTRONICS 8
- CHOP

ISSUE #66, DEC. 1987
- ONE ROOM ADVENTURE
- OS9 TUTORIAL
- RIVER CAPTAIN
- SOUND EFFECTS
- BETTING POOL
- ADVANCE
- MATH TABLES
- ELECTRONICS 9
- LOWER TO UPPER
- NOIDS

ISSUE #67, JAN. 1988
- AUDIO LIBRARY
- SAVE THE EARTH
- WEIGHTS AND MEASURES
- LOW RES PICTURES
- WORD COUNTER
- BACARAT
- BATTLE SHIP
- ELECTRONICS 10
- TAPE CONVENIENCE
- PENQUIN

ISSUE #68, FEB. 1988
- COINFILE
- WORD COUNTER
- SQUIRREL ADVENTURE
- AREA CODES
- DRAW POKER
- TURTLE RACES
- ELECTRONICS 11
- MULTI SCREEN
- CANON PRINT
- *COCO TENNIS*

ISSUE #69, MAR. 1988
- POLICE CADET
- STAMP COLLECTION
- BARRACKS ADVENTURE
- CITY/TIME
- HI-LO/CRAPS
- OLYMPICS
- HI-RES CHESS
- ELECTRONICS 12
- DOUBLE EDITOR
- DOUBLE BREAKOUT

ISSUE #70, APRIL 1988
- BLOTTO DICE
- SUPER COM
- GENESIS ADVENTURE
- PLANETS
- PHK/WAR
- SIGN LANGUAGE
- ARX SHOOTOUT
- ELECTRONIÇS 13
- MAGIC KEY
- SNAP PRINT

ISSUE #71, MAY 1988
- SUPER LOTTO
- ROBOT ADVENTURE
- MAZE
- YAHTZEE 3
- PHASER
- SHAPES & PLATES
- STAR WARS
- ELECTRONICS 14
- PRINTER CONTROL
- MAZE 2

ISSUE #72, JUNE 1988
- FLYING OBJECTS
- THREE STOOGES
- HOSTAGE
- PROGRAM TRIO
- GLADIATOR
- US & CAN QUIZ
- JEOPARDY
- ELECTRONICS 15
- COCO 3 PRINT
- CTTY COMMUNICATOR

MAIL TO:

T & D Subscription Software
2490 Miles Standish Drive
Holland, Michigan 49424
(616) 399-9648

Name ______________________

Address ______________________

City ____________ State ______ ZIP ________

Credit Card # ______________________

Expires ______________________

TOTAL AMOUNT $ ______________________

CIRCLE ISSUES DESIRED

1	9	17	25	33	41	49	57	65
2	10	18	26	34	42	50	58	66
3	11	19	27	35	43	51	59	67
4	12	20	28	36	44	52	60	68
5	13	21	29	37	45	53	61	69
6	14	22	30	38	46	54	62	70
7	15	23	31	39	47	55	63	71
8	16	24	32	40	48	56	64	72

PLEASE CIRCLE

TAPE or DISK

for your printer to underline and print in bold, script or italics, etc. There are provisions to handle all your printing needs.

When you have finished entering your printer codes, you save your setup, write-protect your backup disk, cold-start your computer and run BOOT. You then see the main menu inside a colored window border on the background color you selected:

Type/Edit
Options
Load File
Save File
Print
Exit to DOS

If you wanted to load a file, you would select Load File using the arrow keys. You would then see an instruction window and the directory of your file disk within another colorful window. These helpful windows and the logical use of the control and other function keys make *Word Power* 3.1 very user-friendly.

In the Type/Edit mode, you create or edit documents. At the top of the 80-column screen display is shown the percentage of memory used and the current column, line and page number; it also indicates whether type is in the upper- or lowercase mode and insert or overstrike mode. Another nice feature is the page-break display, which enables you to see exactly where the page ends; this improves the aesthetic appeal of your documents.

The type-ahead feature lets you type as fast as you want — without losing text. It is very easy to center or right-justify text, as well as to underline text or use boldface, italics, super- and subscripts. Underlining is displayed onscreen, and the bold/italicized/etc. text is displayed in different colors. I find this preferable to inserting printer codes within the text that throw off line lengths and page-break locations, and which require much more memorizing.

The Locate/Replace feature lets you find a phrase and replace it with another. I especially like the wild card feature that lets you search similarly spelled words with a single reference.

An instant display of all the commands is available in the help screen, which can be accessed with CTRL-?. The word count feature is great for students. It instantly displays the total number of words in the entire text, regardless of the cursor position.

Another feature is option code embedding, which enables you to change margins, spacing, etc., in a portion of text (for example, a single-spaced quote in double-spaced text). *Word Power* 3.1 has logical embedded codes (for example, LM for left margin, LS for line spacing, etc.). These codes are listed in the help screen.

Word Power 3.1 has a very user-friendly disk input/output menu. The directory, which shows the remaining granules on the disk, is displayed on the left side of the screen. You can select files by simply cursoring through this window and pressing CLEAR; or you may enter your own filename. If you have text in memory and load another file, it will be appended to the text in memory. All saving and loading is done in ASCII format, making *Word Power* 3.1 compatible with most other word processors, spelling checkers and text formatting utilities.

Of all the word processors I have used, *Word Power* has the maximum text storage capacity. On a 512K CoCo 3, it gives you over 460K of text space, which is roughly 336 pages of double-spaced text. On a 128K CoCo, the storage capacity is more than 72K.

In the printing mode, you select parameters such as baud rate, line spacing, page numbering, right justification, number of copies, headers, footers, etc. The single-sheet pause feature lets me use single sheets instead of perforated paper. The WYSIWYG (What You See Is What You Get) feature is excellent! If you elect *not* to print to the printer, you can view the document onscreen as it will appear after printing. Also, *Word Power* is "printer independent"; that is, it is compatible with almost any printer.

With the mail merge feature, you can type a letter, follow it with a list of addresses and print out personalized letters. This is a useful feature for clubs, schools and other organizations that send bulk mail.

The program comes with a spelling checker/dictionary program on a separate disk. It will work with any ASCII file. I find it very handy to proofread my text for spelling errors. It shows how the incorrect word appears in the text and lists possible correct spellings. At this point I have the option to ignore or substitute the correct word. I also have an option to add words for a "personalized" dictionary.

A nifty little punctuation-checking program included on the *Word Power* disk will check the text for punctuation errors such as capitalization, words appearing twice in a row, spacing and more. Note that the program will not correct errors, but mark them. The user can then choose to go back into the file and correct the errors. I am not aware of any similar program for the CoCo.

The package comes with a 40-page manual and a command reference card.

Rulaford Research is proud to announce a new "customer satisfaction" program. When you buy a program from us, you may return it within 30 days if you are not satisfied with it for a complete refund (less a restocking charge of $5.00). In addition, you may purchase a year's free updates for only $10.00 when you buy a program. We want you to be happy with what we sell, and we're ready to go the second mile to make sure that you are!

Lyra, a powerful yet easy-to-use MIDI music composition program, now comes with **LyraPrint**. Print your music on a Tandy, Epson, or OkiData 92A compatible printer. Hundreds of users use it for fun, as part of a teaching program, or professionally. $59.95

Love music but don't know one note from the other? Or do you like to just sit back and let your computer and synthesizer make beautiful music for you? **Lyra Lybrary** is for you. Over 11 disks packed with music of a wide range of styles. Send SASE for complete list of titles and details on how you can have a custom disk made. each disk $14.95

Rulaford Research
P.O. Box 143
Imperial Beach, CA 92032
(619) 690-3648 (evenings 6-10 PT)

Other good stuff: • **FB-01 Calc** is a simple basic program that creates event files for Lyra so you can set up custom configurations for your FB-01 from Lyra. A must if you have an FB-01! $19.95 • Coming soon--complete FB-01 and MT-32 voice editor/librarians. Inquire for availability and price.

Ordering information: send check or money order. Sorry, no credit cards. COD is ok. Shipping and handling included in price. CA residents add 6% tax.

The manual is well-written and guides you step-by-step through the various features.

There is no capability lacking in *Word Power* 3.1 that would preclude its ranking with the highest among word processors, and future enhancements promise to make it a system not to be without. Couple the great text features of *Word Power* 3.1 with the vivid, beautiful colors, and you *really* have "something to write home about"!

(Microcom Software, 2900 Monroe Ave., Rochester, NY 14618, 800-654-5244; $79.95)

— Thomas Poor

Software CoCo 1, 2 & 3

HELLO/BAS — Menu Greetings

I'll admit it: I am not a one-computer woman. Though the CoCo is nearest and dearest to my heart, I dabble with MS-DOS machines (in my work) and have been know to dally with Commodores. But don't judge me too harshly — I always come back to the CoCo, the friendliest and most versatile computer around.

Sometimes, though, I can't help but compare features and inwardly compose a wish list. One thing I wish is that IBM compatibles had a disk operating system built in, like CoCo's Disk BASIC (some Tandy IBM compatibles *do* have MS-DOS built in). It takes IBM machines and their look-alikes so *long* to boot. In comparison, CoCo springs awake, ready to go.

One thing MS-DOS *can* do is automatically execute an AUTOEXEC.BAT file, which can carry out instructions and load specific files for you. With my MS-DOS machine, all I have to do is turn it on — by following the AUTOEXEC.BAT file I wrote, it calls up a menu program that lets me boot (with just one keystroke!) any program on my hard disk. If there's one thing I'm bonkers about, it's menus. And since I'm compiling a wish list, I wish CoCo had an AUTOEXEC.BAT function that could give me a menu of programs on my floppy disk for "point-and-shoot" loading. (Tony DiStefano's projects look interesting, but I am not a hardware person.)

Now, you're probably wondering why I've wasted three paragraphs of what is *supposed* to be a review, spouting off in left field. There's a reason for this: menus.

HELLO/BAS gives 32K ECB CoCos menus. With the program's little auto-repeating cursor, I can zip around an alphabetized menu presentation of a floppy disk directory, press ENTER when I come to a BASIC program I want to load and — bingo — it loads and runs. Just as nifty as my MS-DOS menu.

And what's more, a utility provided allows me to boot *HELLO/BAS* from a floppy by entering the DOS command (this works a lot faster than waiting for MS-DOS's AUTOEXEC.BAT file to finish executing — *HELLO/BAS* does use the high-speed poke). Typing a three-letter command is better than typing the 10-character command, RUN"HELLO".

What's the big deal in saving seven keystrokes? Well, computers *are* supposed to save time — why did you ditch your typewriter in favor of a word processor, anyway? Another reason for using menus is ease of operation. Menus let you set up a sort of "turnkey" system. New users may stare blankly at you when you try to describe the process of calling up a directory, then loading and running a program, but even a child can quickly figure out how to "point and shoot."

The *HELLO/BAS* disk comes with five files: HELLO, DOS BOOT, HELP, DISK INIT and LOG BOOK. HELLO, of course, is the main program. When you run HELLO, the program will read the disk directory, alphabetize and display it. The program can be configured to run on any drive. The screen can show 24 files at a time, but there are extra "pages" that can take care of the 25th file and beyond.

In addition to the alphabetized directory display, the screen also shows you the default drive number, which screen "page" you are currently in, the number of files on the disk and the number of granules free. You select and load a program by moving a cursor to the file (via any arrow key) and pressing ENTER. The auto-repeating "cursor wrap" feature is nice — pressing the down arrow key at File 24 takes you back to the top of the directory list. The program does *not* induce finger sweat. Pressing P allows you to print out a hard copy of the directory; pressing CLEAR lets you read another disk in the current default drive.

DISKINIT creates "autobootable" *HELLO/BAS* disks. It is best to run DISKINIT on newly formatted disks, because the DOS BOOT program it generates is sector-dependent; on a semi-full disk there may already be programs occupying the intended sector. This means that you will probably have to create your own *HELLO/BAS* bootable disks from scratch (a bootable disk must contain DOS BOOT and HELLO — HELP is helpful, but not necessary) and

Check Account Information System

Not just another checkbook program but a user friendly, menu driven, disk based information system. Keep track of deposits, checks, ATM withdrawals and other account transactions. Define up to 36 categories to monitor expenses. Set up automatic transactions for such items as direct deposits and deductions. Balance your account(s) in minutes! Other features include multi-drive capability, display and print options, check search on any field, edit and delete capability and more.

CoCo 3 compatible
Printer optional

RAINBOW CERTIFICATION SEAL

After Five Software
P.O. Box 210975
Columbia, SC 29221-0975
(803) 788-5995

Send check or M.O. for
$34.95 plus $3.00 S/H
COD orders: add $2.00
(SC res. add 5% sales tax)

Reviewed in RAINBOW, February 1988.

Still pounding away at that keyboard?

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
January 1988
August 1987
December 1987
RAINBOW ON DISK
RAINBOW on tape
FEBRUARY
DECEMBER
SEPTEMBER
OCTOBER 1986
Our Beginners Issue

Save Time and Money with a Combination Subscription!

SAVE up to 19%

when you buy a joint subscription to the magazine and either RAINBOW ON TAPE or RAINBOW ON DISK! A one-year subscription to THE RAINBOW and RAINBOW ON TAPE is only $91 in the U.S., $108 in Canada, $153 foreign surface rate and $188 foreign airmail. A one-year subscription to THE RAINBOW and RAINBOW ON DISK is only $115 in the U.S., $138 in Canada, $183 foreign surface rate and $218 foreign airmail.*

Every month, these convenient services bring you as many as 24 ready-to-run programs. Using the current issue of THE RAINBOW as documentation, all you have to do is load and run them. A one-year combination subscription to THE RAINBOW and RAINBOW ON TAPE or RAINBOW ON DISK give you more than 230 new programs! The typing time you save can be spent enjoying your CoCo!

RAINBOW ON TAPE
For No-Fuss Fun

Back issues of RAINBOW ON TAPE are available beginning with the April 1982 issue. A single copy of RAINBOW ON TAPE is $10 within the United States; U.S. $12 in all other countries. The annual subscription rate for RAINBOW ON TAPE is $80 within the U.S.; U.S. $90 in Canada; and U.S. $105 for all other countries.*

RAINBOW ON DISK
Offers OS-9 Programs

In addition to all the programs offered on tape, part of one side of RAINBOW ON DISK is formatted for the OS-9 operating system. That means you can now get all the OS-9 programs from the magazine — programs that cannot be put on tape. Back issues of RAINBOW ON DISK are available beginning with October 1986. Subscriptions to RAINBOW ON DISK are $99 a year in the U.S. Canadian rate is U.S. $115. All other countries, U.S. $130. Single copy rate is $12 in the U.S.; U.S. $14 in Canada; and U.S. $16 in all other countries.*

To order by phone (*credit card orders only*), call (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492.

Look for our envelope located between pages 66 and 67 for ordering individual subscriptions to THE RAINBOW, RAINBOW ON TAPE and RAINBOW ON DISK.

YES! Sign me up for a joint 1-year subscription (12 issues) to:

☐ **THE RAINBOW and RAINBOW ON TAPE**

☐ **THE RAINBOW and RAINBOW ON DISK**

☐ **NEW** ☐ **RENEWAL** (attach labels)

Name ____________________

Address ____________________

City ____________ **State** ________ **ZIP** ________

Payment Enclosed ☐ (*payment must accompany order)

Charge: ☐ **VISA** ☐ **MasterCard** ☐ **Am. Express**

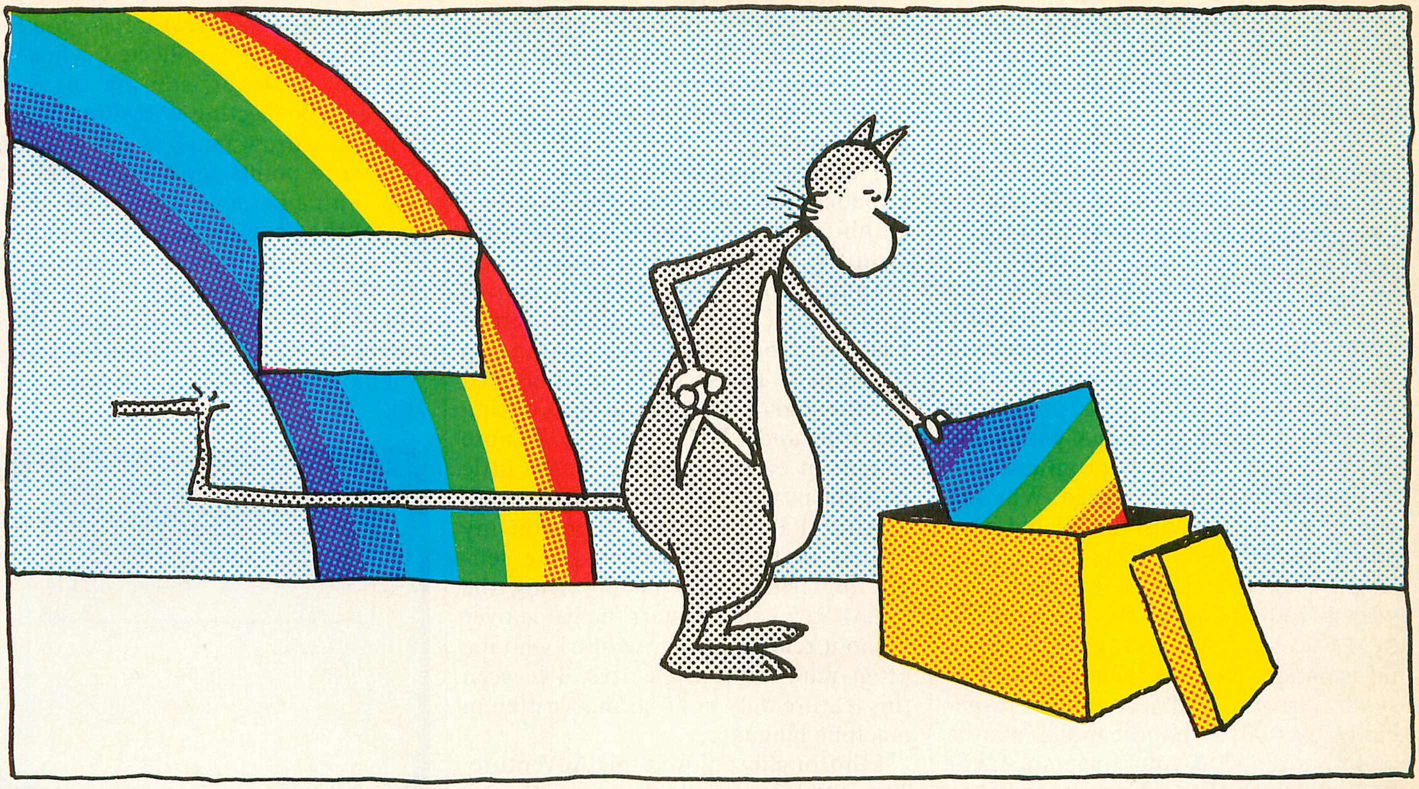
Account Number ____________________

Signature ____________________ **Exp.** ________

*U.S. currency only, please. In order to hold down costs, we do not bill. Kentucky residents add 5% sales tax. Please allow 6 to 8 weeks for delivery of first copies. Joint subscriptions to THE RAINBOW and RAINBOW ON TAPE or RAINBOW ON DISK begin with the current issue.

Please note: While group purchases of RAINBOW ON TAPE and RAINBOW ON DISK are permitted (and multiple subscriptions are even discounted, if purchased in one order from a club), no license to make copies is conveyed or implied. Yes, your group may even purchase a subscription to our disk/tape services, but such purchase in no way authorizes that *any* copies be made of that original disk/tape. Specifically, this means that the original disk/tape itself may indeed be kept in a club library for use by members. However, a group purchase *does not* entitle club members, individually or as a group, to copy that disk/tape.

Unauthorized copying of any copyright product is strictly illegal. The copyright (right to make copies) is in no way conveyed in the purchase transaction.



HOW DO YOU GIVE A RAINBOW?

It's simple — Give a RAINBOW gift certificate . . .

Let a gift subscription to THE RAINBOW carry the premier Color Computer magazine right to your friends' doorsteps. THE RAINBOW is *the* information source for the Tandy Color Computer.

Each month, your friends will enjoy the intelligent programs, reviews and articles written exclusively for their CoCo.

First, your gift will be announced in a handsome card. Then, all year 'round, they'll remember you and your thoughtfulness when they get each edition of THE RAINBOW — more than 200 pages loaded with as many as 24 programs, 15 regular columns and lots of helpful hints and tips.

Generosity benefits the giver, too. There'll be no more tracking down borrowed copies of THE RAINBOW. Your collection will be safe at home.

Give a RAINBOW gift certificate and let your friends in on the fun. THE RAINBOW is the perfect companion for the Color Computer!

Get your order to us by October 25 and we'll begin your friends' subscriptions with the December issue of RAINBOW.

Please begin a one-year (12 issues) gift subscription to THE RAINBOW for:

Name ______________________________

Address ____________________________

City ______________ State __________ ZIP __________

From:

Name ______________________________

Address ____________________________

City ______________ State __________ ZIP __________

☐ My payment is enclosed.

Bill to: ☐ VISA ☐ MasterCard ☐ American Express

Acct. # ____________________ Exp. date __________

Signature ___________________________

Mail to:

Rainbow Gift Certificate, The Falsoft Building, P.O. Box 385, Prospect, KY 40059

For credit card orders call (800) 847-0309, 8 a.m. to 5 p.m. EST.

All other inquiries call (502) 228-4492.

Subscriptions to THE RAINBOW are $31 in the United States; U.S. $38 in Canada. The surface rate to other countries is U.S. $68; the air rate, U.S. $103. Kentucky residents add 5% sales tax. **U.S. currency *only*, please.** All subscriptions begin with the current issue. Please allow 6 to 8 weeks for delivery. In order to hold down non-editorial costs, we do not bill.

copy your favorite BASIC programs to the disk. DOS BOOT and HELLO take up one gran each of disk space, and HELP takes up two.

HELLO/BAS will not load machine language programs, which is a downer. The author apologizes for this lack on one "page" of the nine-page help file.

HELLO/BAS is one professional-looking, well-behaved (as long as you stay away from ML) and user-friendly utility for BASIC programs. Once you start using it, you may find yourself growing spoiled. I like *HELLO/BAS* and have put it on the same disk with some of my favorite RAINBOW programs.

The applications are varied. Whether you're a new CoCoist or an old pro, you'll find a use for *HELLO/BAS*. Seasoned hackers can see whole alphabetized directories at a time (without the SHIFT-@ shuffle), along with other information. New users can circumvent syntax errors. And it would be especially useful for handicapped people and children. Do your fingers a favor and introduce the CoCo in your life to *HELLO/BAS*.

(RCPierce Software, P.O. Box 1787, Main Post Office, Edmonton, Alta., Canada T5J-2P2, 403-474-8435; $19.95 US, $22.95 CDN: First product review from this company appearing in THE RAINBOW)

— Carol Hartman

Software CoCo 1 & 2

Quest for the Ring — The Vanished Kingdom

You say you've solved *Labyrinth* and have already congratulated yourself for a job well done? Not so fast, King William. Zarth, the evil wizard, found out you were escaping and did some fast work before he was destroyed. He hid your crown, locked your castle and made all the people in your kingdom vanish. Then he hid the ring he used to cast all those spells. Now you have to find the ring so you can undo all the spells and get your people back.

You start this graphics Adventure in front of your castle. From there you can wander around the kingdom, looking for your crown and Zarth's ring. The kingdom contains mountains, streams, chasms and a lake, but no people to ask for help. (I happen to think the piranha fish ate them, but the author says Zarth made them disappear!) You're on your own, but you can use any objects you find and the clues they provide. The only living thing you'll ever see is the dragon, and he's not about to help you, believe me!

The first thing that struck me when I loaded the game was the excellent graphics. (If you don't have a color monitor, borrow somebody's. The graphics are *much* better in color.) Every time I went to a different screen I sat there for a minute just soaking up the scenery. The second thing I noticed was the sound. A little song plays during the title and "RIP" screens. A note sounds at every keystroke, and a little bird chirps when it's your turn to input.

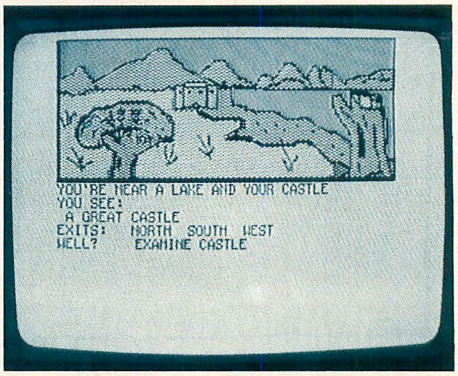
After I died the first time (on my second move!), I discovered the self-booting feature. By just pressing the CLEAR key you can start the game over without reloading. Those of us who die often really appreciate this; I've seen this feature only in programs written in machine language.

I thoroughly enjoyed this Adventure. The graphics and the logic used are a definite plus. Games that have you do illogical things (i.e., go through mirrors) leave me frustrated. In duplicate scenes (like fields), the trees, rocks and chasms are shown in different places, so it's easy to know where you are. *Quest for the Ring* has a limited vocabulary, but I found that more of a help than a hindrance. Everything I needed to do could be accomplished with a dozen commands. And speaking of help, I got all the help I needed when I looked at objects.

I also got all the help I needed from my 10- and 11-year-old sons (and half the neighborhood children). I'd start playing the game and the next thing I knew there'd be three or four chairs pulled up around me, with the occupants offering advice on what to do next. If I left my chair for a cup of coffee, I'd come back to find it occupied by one of the kids, who'd look excitedly at me and say, "I'll take over from here."

Quest for the Ring is a fun game, simple yet challenging. You have to reason things out, but it isn't so complicated that it will take you months of playing to solve. The kingdom is laid out very neatly, and what you have to do is straightforward. Also, you can carry as much as you want. Your hands never seem to get full. This eliminates the decision of what to drop in order to pick up something else. Decisions like those in other games cause a lot of backtracking and frustration for novice Adventurers.

There is no save feature, so you lose everything you've collected whenever you die. However, starting the game over and recollecting everything is fairly easy if you draw a map as you go along. You score points for every object you find, with a possible score of 504 at the end of the game. Don't let the number 504 scare you, though — there aren't 504 objects in the game. Some things you pick up are worth 30 points, others maybe 50. To see what you are carrying, you have to type USE INV instead of just INV.



```
YOU'RE NEAR A LAKE AND YOUR CASTLE
YOU SEE:
 A GREAT CASTLE
EXITS:   NORTH  SOUTH  WEST
WELL?    EXAMINE CASTLE
```

Like its predecessor, *Quest for the Ring* is also a stand-alone Adventure for the CoCo 1 or 2, with 64K disk Extended Color BASIC. Note that it will not work on CoCo 1s earlier than an F board. This two-disk set has 59 Hi-Res screens and can run on either a one or two-drive system. The optional high-speed poke is also available. The disks aren't copy-protected, so workable backups can be made, but only with the BACKUP command. Files cannot be copied one at a time. This protection, the only one the authors put in, prevents the loading and running of any of the single "modules" of the game.

RTB guarantees all its software to load, or you can return it for a prompt replacement at no cost to you. I can personally vouch for this service, because my original review copy didn't load. When I called the company, I expected to hear an answering machine at the other end (it was late Saturday afternoon). What I got was a real person. He was very helpful and supportive, and once he realized he couldn't solve my problem over the phone he sent out a replacement copy immediately.

All in all, I think RTB Software has a real winner here. *Quest for the Ring* is a game that can be played and enjoyed by all ages and skills, and is well worth the price. I'd recommend completing the trilogy with *Labyrinth* and *Adventure in Lumeria*, and watching for other games from this company, which seems to be getting better with each program.

(RTB Software, P.O. Box 777, West Acton, MA 01720, 508-263-0563; $34.95 plus $3 S/H)

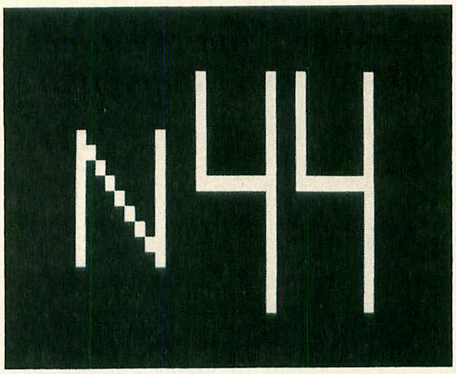
— Gail Allore

Software CoCo 1, 2 & 3

Home Bingo — CoCo Calls the Numbers

Home Bingo is a handy program to have around the house if you like to play this popular game with your family. It's also suited to the commercial bingo halls, although one might have a tough time convincing hard-core bingo patrons that a computer is selecting the numbers randomly. I suppose that being able to see and hear those rattling ping-pong balls provides an added sense of honesty and randomness to the typical bingo player.

Home Bingo is supplied on either disk or cassette and is written in BASIC. It requires a minimum of 32K RAM and Extended Color BASIC, and it works fine on the CoCo 3, as well. The program loads simply by entering `RUN "BINGO"`. A short menu of options is displayed. Both regular bingo games and round robin games are supported.



In regular games, the computer first displays the number sequence, such as *No. 3*, followed by the actual bingo number being called. Numbers such as G58 are extremely large and take up most of the screen.

If the round robin selection is made, the sequence is not counted but the displayed bingo numbers are just as large as in the regular games. The program keeps track of the numbers it calls so that the same number is never duplicated in a game.

All 75 bingo numbers are available in the program and all are displayed in large green characters on a black background with the prefix, such as 'B', being only about half the size of the actual number. This is helpful in that it tends not to distract from the importance of the number itself. Most professional bingo players don't even need to see or hear the prefix. They have played enough games to know that "58" belongs in the 'G' column.

Home Bingo is a good program at a fair price and provides the CoCo user with a way to bring a little more high-tech into those smoke-filled bingo halls across America.

(Williams Enterprises, 53 Old Derry Road, Box 7, Hudson, NH 03051, 603-883-2859; Cassette $9.95 or Disk $11.95, plus $2 S/H: First product review from this company appearing in THE RAINBOW)

— Jerry Semones

HAWKSoft HAWKSoft HAWKSoft HAWKSoft HAWKSoft

DOMINATION....................$18.00
MULTI-PLAYER STRATEGY GAME!
Try to take over the planet of YCNAN. Battle other players armies to take control of their provinces and defend yours. Play on a Hi-res map of the planet. Take the "RISK" and be a planet-lord today!!! Requires Coco 3 1 disk and joystick or mouse. See Rainbow Review JULY 88

MYDOS........................$15.00
CUSTOMIZABLE! EPROMABLE!!
The commands Tandy left out!
MYDOS is an enhancement to Disk Extended Basic 2.1 on the CoCo 3. One command loadm and execute for M/L programs. Lowercase command entry and display on ALL screens. Screen echo and SAY command for RS Speech Pak. Point and click mouse directory.
NEW FEATURES!!!!!
Supports double-sided and 40 track drives. Set any palettes you want on power-up (RGB or CMP). Power-up in any screen width and colors (or monochrome) you wish! More options than you can shake a joystick at!!! See Rainbow Review JUNE 87

HAWKSoft KEYBOARD CABLE........$25.00
UNCHAIN YOUR KEYBOARD!
Five foot extender cable for Coco II and 3. Move your keyboard where you want it! Installation instructions and tips included! Custom lengths availiable.

HAWKSoft P.O. Box 7112
Elgin, Il. 60121-7112
312-742-3084

S&H always included. Il. orders add 7% sales tax.
Checks Money-orders or COD No credit cards.

MLBASIC 2.0 - BASIC Compiler

If you want your BASIC programs to run up to 50 times faster, or want more programming features without learning another language, MLBASIC is for you.

MLBASIC is the most compatible BASIC compiler available for the Color Computer. WHY? Because MLBASIC fully supports:
- Low- and high-resolution graphics
- All types of I/O (disk, screen, printer, RS232)
- All available commands offered with BASIC
- Floating point functions and expressions
- Integer, floating point and string type variables and arrays
- Use of all available 512K RAM in the COCO 3
- 80,40 or 32 column text displays

MLBASIC not only contains everything that you would expect a BASIC programming language should contain, MLBASIC has features that offer flexibility of other languages like C, Pascal, FORTRAN and even assembly language. These features will allow programmers to directly access the CPU registers on the COCO, produce modular program code with SUBROUTINES, manipulate memory in blocks, and even call ROM routines in other areas of memory.

MLBASIC revision 2.0 has incorporated all enhancements that were suggested by MLBASIC 1.0 users and more. Revision 2.0 did away with all the incompatibility problems that existed with revision 1.0.

MLBASIC allows for the first time user to quickly compile a program using default compiler settings. The advanced user has the capability of controlling over a dozen settings which control where the program is compiled, which medium to compile to (memory or disk), string space, compiler listings and more.

With all this going for MLBASIC, your might expect the cost to be a little out of your budget. After looking at prices of other BASIC compilers for the COCO 3 you might be correct. But look again at this ad; for only $59.95, you can have a programming language that will spark your interest once again in the COCO.

Before you buy another BASIC compiler for the COCO, find out if it supports everything MLBASIC supports. Then look at the price tag. We feel that it won't be long before you place an order for MLBASIC.

"MLBASIC is a fine program for any serious programmer," *said David Gerald in the December 1987* RAINBOW.

<<<<< ONLY $59.95 >>>>>
COCO 3 WITH DISK REQUIRED -Add $4.00 Postage.
Check, Money Order or COD accepted
Foreign orders use U.S. MONEY ORDERS only.

WASATCHWARE
7350 Nutree Drive
Salt Lake City, Utah 84121
Phone (801) 943-1546

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

Bug Buster, an upgraded arcade game that has you chasing specimens of the species *Bugus computerum* out of the disk drive, ROM, RAM, power supply and the printer. (The bugs infested your CoCo "a long time ago, while you were looking the other way.") This upgrade to *Bug Buster* features faster action and smaller targets. Requires a 32K CoCo, a disk drive and a joystick. *Tothian Software, Box 663, Rimersburg, PA 16248; $19.95.*

◆ **CMM**, a stock market trading program "that will make money on a particular stock, whether the stock increases or decreases in price, providing the stock returns to its original price." For the CoCo 1, 2 and 3. Requires a disk drive and a DMP printer. *Weller Enterprises, P.O. Box 8004, La Crescenta, CA 91214, (818) 352-6811; $49.95.*

◆ **Good Games Trio**, a collection of 3 two-player games: *ADI*, *Othello* and *Connect Five*. *ADI* is a computerized version of a "board" game invented hundreds of years ago in Africa. *Othello* uses an 8-by-8 board and permits the user to obtain printouts of current games. *Connect Five* is based on the pencil-and-paper game and is mapped out in 10 columns. For the CoCo 1, 2 and 3; uses the high-speed poke. *RCPierce Software, P.O. Box 1787, Main Post Office, Edmonton, AB, Canada T5J 2P2, (403) 474-8435; $19.95 US, $22.95 CDN.*

Hall of the King Trilogy, a trio consisting of *Hall of the King*, *Hall of the King II: The Inner Chamber* and *Hall of the King III: The Earthstone Revealed.* Each graphics Adventure takes place in Firrhest, where a dwarven race once lived, and where the powerful Earthstone is hidden. Each program comes on a flippy — two sides of the disk are used. Requirements include 64K and a disk drive. For the CoCo 1, 2 and 3. *Sundog Systems, 21 Edinburg Drive, Pittsburgh, PA 15235, (412) 372-5674; $74.95 for set, $29.95 each, plus $2.50 S/H.*

← Corrected pg 138 Nov 88 RB

◆ **Hard Bodies**, an on-disk swimsuit issue — "page after page of models in swimsuits that will make your CoCo screen sizzle." For the CoCo 1, 2 and 3; requires 64K disk. *Baron Products, 3937 Shady Hill, Dallas, TX 75229, (214) 350-3900; $15.*

See pg 125

◆ **HELLO/BAS**, a directory utility that lets you list and print a disk directory in alphabetical order, swap default drives with a key press and load and run BASIC programs from a menu. For the CoCo 1, 2 and 3. Requires 32K ECB and uses the high-speed poke. *RCPierce Software, P.O. Box 1787, Main Post Office, Edmonton, AB, Canada T5J 2P2, (403) 474-8435; $19.95 US, $22.95 CDN.*

In Quest of the Star Lord Hint Sheet, a listing of the commands necessary to solve Sundog Systems' CoCo 3 *In Quest of the Star Lord* Adventure. The commands are encoded (but you have the key) in order that you don't learn more than you wanted to by a careless glance. The hint sheet is intended to be sold only to registered owners of *In Quest of the Star Lord. Sundog Systems, 21 Edinburg Drive, Pittsburgh, PA 15235, (412) 372-5674; $3.95.*

Moneyman II, a menu-driven program composed of seven modules designed to perform common financial calculations: Savings Planner, Loan Planner, Budget Planner, Checking Account, Savings Account, Reconcile Bank Statement and Summarize Deductibles. The modules interact and call on each other as needed. Requires 32K ECB and a disk drive. An additional drive is optional, and a printer is recommended. *Tothian Software, Box 663, Rimersburg, PA 16248; $24.95.*

◆ **Night of the Living Dead**, a text Adventure with a ghoulish turn: You are lost in a remote area, and the dead are waking up. The only goal is to survive. As an incentive, the company is offering $500 to the first player whose character can live through it (deadline December 31, 1988). For the CoCo 1, 2 and 3. Requires 64K and a disk drive. *Adventure Novel Software, P.O. Box 8176, Spartanburg, SC 29305, (803) 578-7421; $34.95 introductory offer.*

VIP Database III, a CoCo 3 database that supports 40-, 64- and 80-column screens, uses separate text and highlight colors for easy data entry, features in-memory sort of all records and a built-in print spooler. The database can store up to 550 records of 256 characters on a one-disk system, and it supports multi-criteria searches with up to 16 separate relational keys. Requires the CoCo 3. *SD Enterprises, P.O. Box 1233, Gresham, OR 97030, (503) 663-2865; $69.95.*

◆ **Wildcard Copy**, a Disk BASIC supplement that lets you do a multiple copy with one command, equivalent to the `COPY *` command on other systems. It can be used to copy files with the same name but different extensions and files that share an extension. The program is written in BASIC for two disk drives and the CoCo 1, 2 and 3. *RVC Software, P.O. Box 560, Englishtown, NJ 07726, (201) 446-2033; $15.*

◆ **Word Processing: TRS-80 & Star NX-10**, a word processing program written in BASIC for the duo of the CoCo and the Star Micronics NX-10 dot matrix printer. The program takes advantage of the printer's capabilities, including underlining, italics, NLQ print, emphasized and bold print, superscripts and subscripts, Pica and Elite, etc. For 64K CoCo 1, 2 and 3; comes on cassette only. *Lee Sullivan, P.O. Box 8718, Penacook, NH 03303, (603) 753-4497; $12.*

◆ **First product received from this company**

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— **Lauren Willoughby**

Computer Island Educational Software

ARROW GAMES

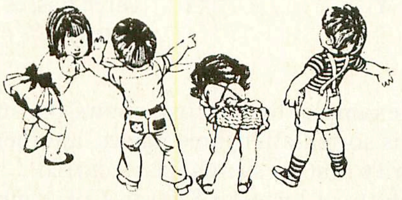
32K Ext. - $21.95 tape/$26.95 disk

Six menu driven games for young children (ages 3-6) to teach directions. All games involve using the arrow keys ONLY. Games include: LADYBUG, BUTTERFLY, ARROW MATCH, KALEIDOSCOPE, RABBIT, and DOODLE. Colorful graphics.

FIRST GAMES

32K Ext. - $24.95 tape/$29.95 disk

First Games contains 6 menu driven programs to delight and teach your early learners (ages 3-6). These games enrich the learning of colors, numbers, lower case letters, shapes, memory visual discrimination and counting.



CLOZE STORIES

32K Ext. - $19.95 Tape/$24.95 Disk

These programs give students practice using the popular CLOZE reading technique. Each program contains grade appropriate short stories with key missing words to be deduced by the student. Available for grades 3, 4, 5, 6, OR 7. Please specify.

DRAWING CONCLUSIONS

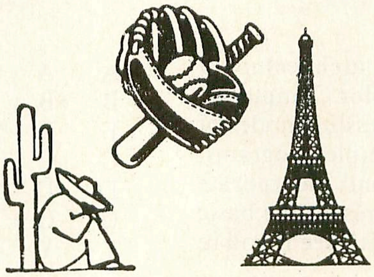
32K Ext. - tape $19.95/disk $24.95

These programs contain short stories. Each story has two accompanying questions that ask the student to draw conclusions from the text. Available for grades 3-4 OR 5-6. Please specify.

LOCATING STORY DETAILS

32K Ext. - disk only - $24.95

These programs contain short stories. Each has an accompanying picture. Questions about story details refer to either the text or pictures. The disk generated graphics are an integral part of these attractive programs. Available for grades 2-3 OR 4-5. Please specify.

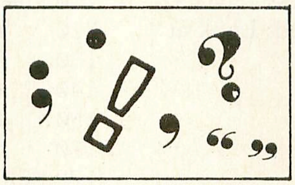


FOREIGN LANGUAGE GAMES

32K Ext. - $19.95 tape/$24.95 disk (500 words)

French or Spanish Baseball

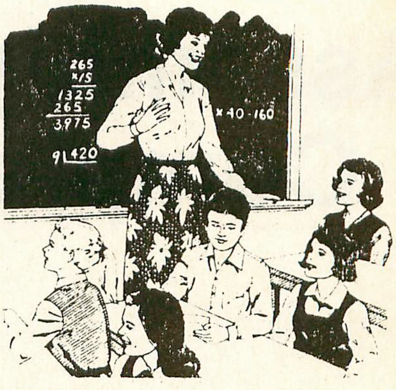
Score base hits or home runs for correct answers. You're out if wrong. Correct answers supplied. Fun way to learn and practice vocabulary. PLEASE SPECIFY LANGUAGE.



PUNCTUATION PRACTICE

32K Ext. - tape $19.95/disk $24.95

On screen practice in proper usage of the familiar punctuation marks. Grades 3-7.



MATH TUTOR SERIES

16K Ext.

These tutorials take the child through each step of the example. All programs include HELP tables, cursor and graphic aids. All allow user to create the example, or let the computer choose. Multi-level. Great teaching programs.

LONG DIVISION TUTOR
$14.95 tape/$19.95 disk
MULTIPLICATION TUTOR
$14.95 tape/$19.95 disk
FACTORS TUTOR
$19.95 tape/$24.95 disk
FRACTIONS TUTOR (addition)
$19.95 tape/$24.95 disk
FRACTIONS TUTOR (subtraction)
$19.95 tape/$24.95 disk
FRACTIONS TUTOR (mult.)
$19.95 tape/$24.95 disk

COMPUTER LITERACY

32K Ext. - $19.95 tape/$29.95 disk

A computer literacy quiz exclusively for the Color Computer. Tests and scores from over 60 questions on a Hi-res upper and lower case screen. Reviews computer literacy and beginning programming knowledge. Ages 10 and up.

RAINBOW
CERTIFICATION
SEAL

Computer Island

(718) 948-2748

VISA

Dept. R 227 Hampton Green, Staten Island, N.Y. 10312

MasterCard

Send for catalog with complete descriptions.

Please add $1.00 per order for postage. N.Y. residents, please add proper tax. FREE set of BINARY DICE, including full directions, with orders of 2 or more items.

Dealer Inquiries Invited.

TRS-80 Color Computer

All Payments in U.S. Funds.

Barden's Buffer

16K

Assembly Language for the Complete Novice: Part II

By William Barden, Jr.
Rainbow Contributing Editor

Last month's column looked at the basic architecture of the 6809 microprocessor used in the Color Computers, and many of the instructions and addressing modes of the 6809. In this column, I'll write some simple programs, assemble them by hand and by assembler and incorporate them in BASIC programs. This column will present the basic ideas of assembly language programming. Let's see if you're brave enough to learn it.

Hand Assembling

A *sort* usually arranges items in alphabetical order, generally from A to Z. Therefore, if we want to sort all the characters on a text screen in order, we would use a sort — probably a *bubble sort.*

A Bubble Sort

A bubble sort compares the first entry in a list with the next one. If that entry is smaller, swap the entries. The bubble sort continues, one entry at a time, until it reaches the end of the list. If any entries are switched, the process repeats. When no swap has been switched, the list is sorted. Look at the following example:

```
*F   F   F   F   F   F   F
 G  *G   A   A   A   A   A
 A   A  *G   B   B   B   B
 B   B   B  *G   G   G   G
 Y   Y   Y   Y  *Y   C   C
 C   C   C   C   C  *Y   D
 D   D   D   D   D   D  *Y   (one pass over)

*A   A   A   A   A   A   A
 F  *B   B   B   B   B   B
 B   F  *F   F   F   F   F
 G   G   G  *C   C   C   C
 C   C   C   G  *D   D   D
 D   D   D   D   G  *G   G
 Y   Y   Y   Y   Y   Y  *Y   (two passes over)

*A   A   A   A   A   A   A
 B  *B   B   B   B   B   B
 F   F  *C   C   C   C   C
 C   C   F  *D   D   D   D
 D   D   D   F  *F   F   F
 G   G   G   G   G  *G   G
 Y   Y   Y   Y   Y   Y  *Y   (three passes over,
                                sorted)
```

In the preceding example, the asterisk shows the suspect item. While the list is sorted after three passes, another pass must be made to verify that no switch has occurred.

The text screen starts at location $400 in CoCo memory and goes to $5FF, 512 characters. Here is a BASIC program that would complete this sort:

```
100 Y = 0
110 FOR X = &H400 TO &H5FE
120     A = PEEK( X )
130     IF A <= PEEK ( X + 1 ) THEN GOTO 1701
140     B = PEEK( X + 1 )
150     POKE X, B:POKE X + 1, A
160     Y = 1
170 NEXT X
180 IF Y< > 0 THEN GOTO 100
190 END
```

If you run this program, you'll see the characters on the screen rearrange themselves in alphabetical order — really a CoCo-coded order, like ASCII. Figure 1 shows the results of the sort after the program is listed on the screen. The sort takes quite a long time in BASIC — about 58 minutes, depending on the characters' random order. How would this be done in assembly language?

The Assembly Language Version

The sort compares two values, the current location and the current location + 1. To compare in assembly language, we must have one value in a register — typically the A or B register — and compare it with another value in memory. In

---

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

```
AAAAAAAAAAAAAAAABCCDDDDDDDEEEEEE
EEEEFFFFFFFGHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHIIKKNNOOOOOOPRRRRR
SSTTTTTTTUUUX







                               &
&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&
(),,,,,,,,,,,,,,,,,,,,,,,,,,,000
00000000000000000000000000000000
00000011111111111111122222222333
33334444445666677888888889:::===
```

Figure 1: After the Sort

machine language, the compare instruction would be presented in this manner:

```
LDA      ,X+      GET FIRST ENTRY
CMPA     ,X       COMPARE TO I+1
BLS      ONE70    GO IF ENTRY I GE ENTRY I+1
```

The `LDA` instruction loads the A register with the current entry from the screen. `LDA` uses the X register as a pointer to the screen. X changes from $400 to $5FF and has been loaded with an address in this range before the compare instruction. The plus sign on the `LDA` adds one to the contents of X *after* the load, so that X now points to the *next* location on the screen.

The `CMPA` instruction *compares* the contents of the A register with the contents found at the screen location indicated by the X register. The X register now points to the Screen Location +1. `CMPA` affects the *condition codes* in the CPU. The condition codes have a bit for a zero condition, negative condition and carry condition. Both signed and unsigned comparisons can be tested. In this case the comparison is unsigned, and is a `BLS` (Branch on Less Than or Same). A branch is made to Location `ONE70` only if the contents of A were less than or equal to the contents of the next screen location.

If the next screen location had been greater than A, the two locations would have been switched. Because the A register already contains the current value, the B register can be loaded with the next value for the swap. The two locations can be switched by storing A in the next location and B in the current location in this manner:

```
LDB      ,X       GET SECOND ENTRY
STB      -1,X     SWAP B TO A
STA      ,X       SWAP A TO B
```

A *change* flag must also be set. Use the Y register for the

The Saint John Gallery
Presents:
THE ASTRO FORTUNE TELLER
A VERITABLE ORACLE
BASED UPON YOUR PERSONAL
PLANETARY CONFIGURATIONS
AFTER ENTERING YOUR GIVEN NAME
YOUR BIRTHDATE & THE PRESENT DAY
YOU RECEIVE THE ANSWER TO ANY
OF 30 PREDEFINED QUESTIONS
THOSE QUESTIONS OF LIFE • LOVE •
SUCCESS • MARRIAGE • FORTUNE •
MOST OFT ASKED BY MEN & WOMEN
THIS PROGRAM IS OVER 150K YET DUE
TO MODULAR APPROACH WILL RUN ON 32K-512K SYSTEMS
FOR THE SERIOUS INQUIRER OR GREAT FOR PARTIES !!
The Astro Fortune Teller ÷ DISK $21.95

THE BEST BBS
WILL WORK WITH COCO'S OWN SERIAL PORT & ANY AUTO-ANSWER
MODEM • 1-4 DRIVES • 32K-512K X MODEM DISK $18.00

Temple Of Lost Ark + ADV. 32K (TEXT) DISK $12.00

THE SOUND MACHINE 32K
HAVE YOUR COCO DIGITIZE AND SAVE YOUR SPEECH
DOZENS OF SAMPLES INCLUDED • DISK $19.95

DISK EDITOR II INNOVATIVE TECHNIQUE
LETS YOU EDIT YOUR
DISKS LIKE LARGE WORD PROCESSING FILES - DISK $18.00
32K

SEND CHEQUE OR M.O. + $1.75 P&H (CANADA $2.25) TO:
St. JOHN GALLERY, P.O. BOX 613 Mt. SINAI N.Y. 11766

Alpha Software Technologies

OS9 Level II BBS Release 2

The best BBS system has just gotten better! System comes complete and ready to run in less than 5 minutes! Use the built in menus or create your own, you can even run your own programs or games on-line! Complete message system allows easy message posting and retrieving. Complete file transfer system supports Xmodem and Ymodem as well as keyword searching, single line, and paragraph file descriptions. System runs completely in the background, allowing you full use of your computer!
512k OS9 Level II Required..........................$29.95

The Zapper

This wonderful utility allows you to patch anything! Patch commands directly on the disk and fix CRC's automatically! Even allows you to patch the OS9Boot file without making a new boot disk! Save files that have been lost or deleted! Fix crashed disks! Hundreds of uses!
64k OS9 Level I or II Required..................$19.95

Disk Manager Tree

This versatile utility will make your OS9 life a breeze! No more will you have to fight with complicated directory structures. No more searching for files and typing long path names. All of this is displayed with windows. A tree window allows you to change, create, and delete directories quickly. A files window allows you to copy, view and delete files easily. Perfect for the OS9 beginner! Multi-View compatibility makes it perfect for Multi-View users!
512k OS9 Level II Required..........................$29.95

OS9 Toolkit

Finally OS9 life becomes easy! With these great utilities you'll be using OS9 like a pro! Complete wildcard commands make file manipulation simple and easy! Tree commands make directory manipulation a breeze! The many other utilities make OS9 much easier to use! 16 utilities in all! At $19.95 that's less than $1.25 a utility!
OS9 64k Level I or II Required......................$19.95

Level II Tools

Level II tools includes all tools in the level I toolkit, plus 9 great level II utilities! Utilities include commands for changing colors, creating overlay windows complete with borders, browsing through files, and more! At 24.95 it's less than $1.00 per utility!
128k OS9 Level II Required......................$24.95

Warp1

Finally, a complete OS9 level II terminal program that you can afford! Program features Auto-dial, Auto-macro, File transfers, buffer capture, on-line timer, and much much more! Level II windows make it super simple to use! All you'll ever need in a terminal program! Comes complete with ICONS for Multi-View compatability!
512k OS9 Level II Required.....................................$34.95

Multi-Menu

Easily create your own pop-down menus with this great utility! No programming experience neccessary! With this great utility you can run any OS9 command or program from a menu. Menu creation is super-easy and super-simple! Actually create the menu from the menu! A must for any Multi-View user!
512k OS9 Level II and Multi-View Required........................$19.95

Please add $3.00 for shipping and handling.
C.O.D. orders please add an additional $2.00 C.O.D. charge

Send check or money order to:Alpha Software Technologies
2810 Buffon St.
Chalmette, La. 70043
C.O.D. orders call: (601) 266-2773

ag. A '1' is loaded into the register to indicate the f no change occurs, the register will hold 0): `LDY #1` ANGE".

ntire code, including a compare instruction, swap (if necessary) and set change flag, now looks like this:

```
LDA     ,X+       GET FIRST ENTRY
CMPA    ,X        COMPARE TO I+1
BLS     ONE70     GO IF ENTRY I GE ENTRY I+1
LDB     ,X        GET SECOND ENTRY
STB     -1,X      SWAP B TO A
STA     ,X        SWAP A TO B
LDY     #1        SET "CHANGE"
```

At this point, we also know that the Y register is initially set to 0 and that the X register points to the start of the screen memory:

```
LDX     #$400     POINT TO SCREEN
LDY     #0        SET CHANGE FLAG TO 0
LDA     ,X+       GET FIRST ENTRY
CMPA    ,X        COMPARE TO I+1
BLS     ONE70     GO IF ENTRY I GE ENTRY I+1
LDB     ,X        GET SECOND ENTRY
STB     -1,X      SWAP B TO A
STA     ,X        SWAP A TO B
LDY     #1        SET "CHANGE"
```

Since this action is taken for every screen location from $400 to $5FE, stopping at $5FE, we must have a way to stop the compare instruction. X is incremented from $400 through $5FE. When it reaches $5FF, we should stop to see if the change flag has been set. If it has, we must go back for another pass. If it has not, the sort is complete. If X does not stop at $5FF, however, we'll continue looping and compare for *this* pass:

```
CMPX    #$5FF     TEST FOR SCREEN END
BNE     ONE10     GO IF NOT ONE PASS
```

If one pass has been completed, test the change flag by comparing the contents of the Y register with 0 and branching back if Y = 1 (indicating that at least one swap has occurred):

```
CMPY    #0        TEST CHANGE FLAG
BNE     HUNDRD    GO IF CHANGE OCCURRED
```

The whole sequence now looks like this:

```
LDX     #$400     POINT TO SCREEN
LDY     #0        SET CHANGE FLAG TO 0
LDA     ,X+       GET FIRST ENTRY
CMPA    ,X        COMPARE TO I+1
BLS     ONE70     GO IF ENTRY I GE ENTRY I+1
LDB     ,X        GET SECOND ENTRY
STB     -1,X      SWAP B TO A
STA     ,X        SWAP A TO B
LDY     #1        SET "CHANGE"
CMPX    #$5FF     TEST FOR SCREEN END
BNE     ONE10     GO IF NOT ONE PASS
CMPY    #0        TEST CHANGE FLAG
BNE     HUNDRD    GO IF CHANGE OCCURRED
```

There are several branches in this sequence. We've named them to correspond to the BASIC implementation of this sort. If we use *labels* instead of line numbers, as in BASIC, we have:

```
HUNDRD  LDX     #$400   POINT TO SCREEN
        LDY     #0      SET CHANGE FLAG TO 0 ONE10
        LDA     ,X+        GET FIRST ENTRY
        CMPA    ,X         COMPARE TO I+1
        BLS     ONE70      GO IF ENTRY I GE ENTRY I+1
        LDB     ,X         GET SECOND ENTRY
        STB     -1,X       SWAP B TO A
        STA     ,X         SWAP A TO B
        LDY     #1         SET "CHANGE"
ONE70   CMPX    #$5FF      TEST FOR SCREEN END
        BNE     ONE10      GO IF NOT ONE PASS
        CMPY    #0      TEST CHANGE FLAG
        BNE     HUNDRD  GO IF CHANGE OCCURRED
```

(I've indented to indicate the inner loop.)

Hand Coding

My first program — one that read a single punched card from a card reader and then boot the system — was completely hand coded. In one card, I made a quantum leap in my understanding of assembly language programming. I'm not saying that hand coding this program will do the trick for you, but it may help.

The first step in hand coding is to make a skeleton of the instructions based upon instruction length. You can find the instruction length in the list of instructions found in the back of assembler manuals, on a 6809 instruction sheet or in books on 6809 programming. As I explained in the last column, different addressing modes require different instruction lengths, as do different types of instructions. Branch instructions are always two bytes — opcode followed by displacement value. *Load immediate* instructions are two or three bytes — opcode followed by a 1-byte (A or B) value or a 2-byte (D, X or Y) value. *Load from memory* instructions are 3-byte instructions — opcode followed by two bytes of

Two-Liner Contest Winner . . .

Here is a utility to display a slower, more organized directory listing, good for those who find it difficult to keep up with DIR's fast scroll-through. It handles up to 72 files.

Hit spacebar for individual prgm listing.

The listing:

```
0 CLS:CLEAR2000:K=0:M=1:FORA=3TO
11:DSKI$ 0,17,A,B$,C$:D$=B$+LEFT
$(C$,127):E$(0)=LEFT$(D$,8):FOR
F=1TO7:E$(F)=MID$(D$,F*32+1,8):N
EXTF:FOR G=0TO7:PRINT@K,"#";M")"
E$(G):K=K+16:M=M+1:IF K>500THEN
K=480
1 EXEC44539:NEXTG:NEXTA:END
```

Won't [illegible] for my Coco 3!

John M. Beck
Suitland, MD

(For this winning two-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

memory address. *Indexed addressing* instructions vary depending upon the offset. The skeleton here looks like this:

```
XXXXXX     HUNDRD LDX    #$400     POINT TO SCREEN
XXXXXXXX          LDY    #0        SET CHANGE FLAG TO 0
XXXX       ONE10  LDA    ,X+         GET FIRST ENTRY
XXXX              CMPA   ,X          COMPARE TO I+1
XXXX              BLS    ONE70       GO IF ENTRY I GE ENTRY I+1
XXXX              LDB    ,X          GET SECOND ENTRY
XXXX              STB    -1,X        SWAP B TO A
XXXX              STA    ,X          SWAP A TO B
XXXXXXXX          LDY    #1          SET "CHANGE"
XXXXXX     ONE70  CMPX   #$5FF       TEST FOR SCREEN END
XXXX              BNE    ONE10       GO IF NOT ONE PASS
XXXXXXXX          CMPY   #0        TEST CHANGE FLAG
XXXX              BNE    HUNDRD    GO IF CHANGE OCCURRED
```

Each two X's represent two hexadecimal digits or one byte. Now we can add the opcodes for the instructions by finding them in the instruction list:

```
8EXXXX     HUNDRD LDX    #$400     POINT TO SCREEN
108EXXXX          LDY    #0        SET CHANGE FLAG TO 0
A6XX       ONE10  LDA    ,X+         GET FIRST ENTRY
A1XX              CMPA   ,X          COMPARE TO I+1
23XX              BLS    ONE70       GO IF ENTRY I GE ENTRY I+1
E6XX              LDB    ,X          GET SECOND ENTRY
E7XX              STB    -1,X        SWAP B TO A
E7XX              STA    ,X          SWAP A TO B
108EXXXX          LDY    #1          SET "CHANGE"
8CXXXX     ONE70  CMPX   #$5FF       TEST FOR SCREEN END
26XX              BNE    ONE10       GO IF NOT ONE PASS
108CXXXX          CMPY   #0        TEST CHANGE FLAG
26XX              BNE    HUNDRD    GO IF CHANGE OCCURRED
```

Note that some opcodes are made up of two bytes. Motorola ran out of opcodes and also wanted to make frequently used instructions shorter.

Now we can add the immediate values — values loaded into a register and found within the instruction. For example, the `LDX` instruction loads $400 into the X register:

```
8E0400     HUNDRD LDX    #$400     POINT TO SCREEN
108E0000          LDY    #0        SET CHANGE FLAG TO 0
A6XX       ONE10  LDA    ,X+         GET FIRST ENTRY
A1XX              CMPA   ,X          COMPARE TO I+1
23XX              BLS    ONE70       GO IF ENTRY I GE ENTRY I+1
E6XX              LDB    ,X          GET SECOND ENTRY
E7XX              STB    -1,X        SWAP B TO A
A7XX              STA    ,X          SWAP A TO B
108E0001          LDY    #1          SET "CHANGE"
8C05FF     ONE70  CMPX   #$5FF       TEST FOR SCREEN END
26XX              BNE    ONE10       GO IF NOT ONE PASS
108C0000          CMPY   #0        TEST CHANGE FLAG
26XX              BNE    HUNDRD    GO IF CHANGE OCCURRED
```

Now let's tackle the branches. In the last column, we learned that branches use a relative addressing mode, which adds the current location to a displacement field in the instruction. To hand code this value, do the following: For a forward branch, start at `0=next` instruction after the

DATAMATCH, INC.
(THE SOFTWARE HOUSE HAS A NEW NAME)

DS/DD DISKS $45/100
10/$4.95

FLIPPY DISKS 10/$7.95
FACTORY PUNCHED-USE BOTH SIDES. $75/100
CERTIFIED ERROR FREE. W/SLEEVES, LABELS, W.P.

PRINTER RIBBONS

APPLE IMAGE WRITER	$ 4.95	6/$27.00
APPLE IM.WR.II 4 COLOR	$12.95	
APPLE LQ - M/S	$ 4.95	
COMMODORE MPS 801	$ 4.95	R.S. DMP110
COMMODORE MPS 803	$ 4.95	
COMMODORE 1526	$ 7.50	BLUE STREAK
DIABLO HYTYPE II - M/S	$ 4.95	
EPSON MX80/86E	$ 4.95	6/$27.00
EPSON SPECTRUM LX80/90	$ 4.50	
GEMINI 10/S/SG, BLACK	$ 2.00	DOZ./$22.00
GEM COLORS R-B-G-BR-PUR	$ 3.00	5/$12.00
NEC P2/P6 FILM	$ 6.95	
NEC P3/P7 FILM	$ 8.95	
OKIDATA 80/82/90/92 - SEE GEMINI 10		
OKI.MICROLINE 182/192	$ 7.50	
R.S. DMP130, BLACK	$ 6.95	
COLORS RED-BLU-GREEN	$ 7.95	3/$22.00
STAR NL/NX/10, BLACK	$ 7.95	
STAR RADIX 10, BLACK	$ 7.80	

OTHER RIBBONS AVAILABLE. CALL OR WRITE.

ALL ITEMS 100% GUARANTEED

Add $2.50 S/H in U.S.A. - Canada Add $3.50 + $1.00/LB
Michigan Residents Add 4% Sales Tax
Send Check/Money Order Payable to:

DATAMATCH, INC.
VISA
9020 Hemingway, Redford, MI 48239
(313) 937-1313
MasterCard
Send Card Number & Exp. Date
Min. Charge Order $20.00

"I cannot imagine the CoCo 3 without ADOS-3; it would not be a complete machine."
The RAINBOW, July 1987

You've moved up to a CoCo 3. A powerful new machine. Now, it's time to give BASIC a shot in the arm, with ADOS-3. Wouldn't it be nice to turn on your machine and be greeted by an 80-column display, in the colors of your choice, with your own custom startup message? To run routinely at 2 MHz (double speed) without having to slow down for disk and printer operations? This and much, much more is possible with ADOS-3, our CoCo 3 adaptation of the acclaimed original ADOS, which shares the original's virtual 100% compatibility with commercial software. After customizing ADOS-3 using the provided configuring utility, you can have it burned into an EPROM that plugs into the Disk BASIC ROM socket, or just use it in RAM as a disk utility. (EPROM + burning will cost $15-20; we provide information concerning how you can have this done.) Supports double-sided drives (35, 40, or 80 tracks). FAST and SLOW commands, auto line number prompts, RUNM command, keystroke macros, arrow-key scroll through BASIC programs, auto-edit of error line, and many more valuable features.

"ON A SCALE OF 1 TO 10, I RATE ADOS-3 A SOLID 15." RAINBOW, 7/87
Disk . . . $34.95 Original ADOS for CoCo 1 or 2 . . . $27.95 (See 6/87 RAINBOW review)
Original ADOS plus ADOS-3 ....$50.00

THE PEEPER
ML program tracer that multitasks with the target program. An excellent learning tool for the ML novice; an invaluable debugging aid for the expert. CoCo 1, 2, or 3 compatible.
Disk . . . $23.95 Assembler source listing . . . Add $3.00

MONITOR CABLES for CoCo 3
Magnavox 8CM515/8CM505/8CM643 . . . $19.95 Sony KV1311CR . . . $29.95

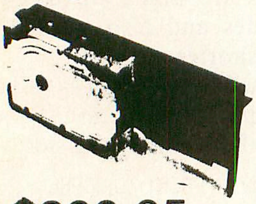
SPECTROSYSTEMS
11111 N. Kendall Drive,
Suite A108
Miami, Florida 33176
(305) 274-3899 Day or Eve.

No delay on personal checks • Please add $2.00 shipping • Sorry, no credit cards or COD's.

TANDY ADD-ONS

For Tandy 1000, SX, TX

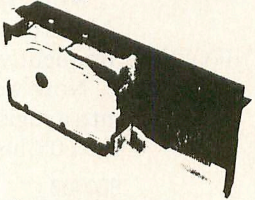
10 Meg Hard Card



$299.95

1000, SX, TX

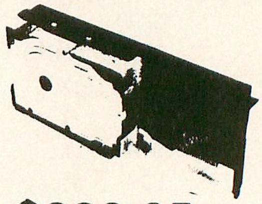
20 Meg Hard Card



$349.95

1000, SX, TX

30 Meg Hard Card

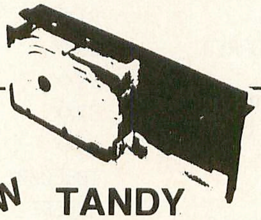


$399.95

1000, SX, TX

Hard Drive Kits

10 Meg	$279.95
20 Meg	$339.95
30 Meg	$379.95
40 Meg	$499.95



NEW

TANDY

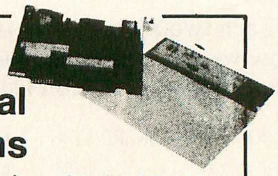
1000, SX, TX

49 Meg Hard Card

32 MS (speed)

$599.95

Rodime



NEW Cardinal Modems

2400 Baud 300/1200/2400

(Hayes Compatible)

Complete with software manuals

ONLY **$149.95**

TANDY 1000

1000, SX, TX

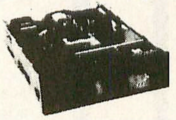
Cards

300/1200 Modem	$119.95
300/1200/2400 Modem	$149.95
Mini IO	$79.95
2 Meg Board	$169.95

1000, SX, TX, 3000, 4000

2nd Floppy

360K	TEAC	$119.95
720K	Mitsubishi	$99.95
3½"	Mitsubishi	$119.95



1000, 1000A

Memory Cards

Zucker Memory

- DMA & 512K — CALL

Zucker Multifunction

- Serial
- Real Time Clock
- 512K DMA
- Software

CALL

Tandy 3000 & 3000HL

Hard Drive Kits

Includes Drive, Controller & Cable

20 Meg	$399.95
30 Meg	$599.95
40 Meg	$699.95
80 Meg	$999.95

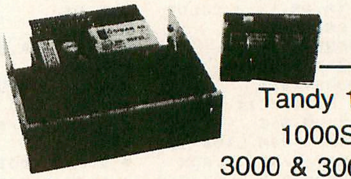
Tandy Model 3, 4, 4P

Hard Drive Systems

External

Complete - ready to run

10 Meg	$499.95
20 Meg	$699.95



Tandy 1000,
1000SX,
3000 & 3000HL

Tape Backup

20, 30, 40 Meg Tape Backup	$399.95
60 Meg Tape Backup Archive	$659.95

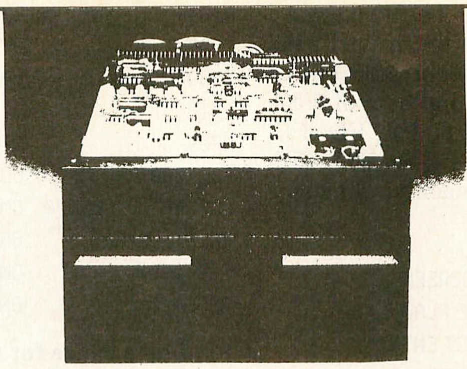
TRUE DATA PRODUCTS
115 So Main Street
Uxbridge, MA 01569
Tel. 617-278-6555
1-800-635-0300
Hours: 9 a.m.-6 p.m., Sat. 10 a.m.-4 p.m.

NEW
DISK DRIVES

Starting at

89^{95}

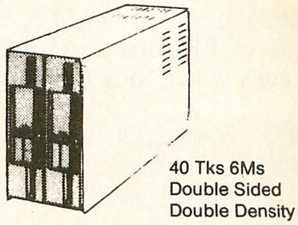
with case & Power Supply
129.95



TANDON MPI TEAC

Speed 6ms tk to tk and up
Capacity 250k unformatted
Tracks 40
Warranty *now 1 Year*

New Low Price!



40 or 80 Tracks
½ Hght. Teac/Panasonic

1 YEAR Warranty!

SATISFACTION GUARANTEED!!

ALL DRIVES FULLY TESTED AND WARRANTEED

We carry only the finest quality disk drives
no seconds • no surplus

Free Software for Drive 0 Systems

CoCo Checker...Test roms, rams, disk drives and & controller printer, keyboard cassette & more.
Tape/Disk Utility...Transfers disk to tape and tape to disk.

169^{95} Drive 0

- Full Ht Drive
- Single Case
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & manuals

189^{95} Drive 0

- Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

289^{95} Drive 0 & 1

- 2 Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

Other Drive Specials

Drives cleaned, aligned & tested, **29^{95}**

119^{95}
2nd Drive
for new Radio Shack
includes:

- Slim Line DS/DD Drive
- Cabling & Instructions
- Mounting Hardware

Full Ht Drive	89^{95}
Full Ht Drive Ps/Case	129^{95}
Slim Line Drive	99^{95}
Slim Line Drive Ps/Case	139^{95}
2 Slim Drives Ps/Case	239^{95}
Disk Controller	59^{95}

Single Ps & Case	44^{95}
Dual ½ht Ps & Case	54^{95}
Dual Full Ht. Ps & Case	79^{95}
Disk Controller	59^{95}
10 Diskettes with free library case	9^{95}

Dealer Inquiries Invited

617-278-6555

We welcome
- Visa/Mastercard
- Checks (allow 2 weeks for clearing)
- C.O.D. Add $2.

TRUE DATA PRODUCTS

9 South Main Street
Uxbridge, MA 01569
617-278-6555
Hours: Mon.-Sat., 9-6 (EST)

***Call us today!* 617-278-6555**
Order Toll Free 1-800-635-0300

branch and add one for each following byte. For a backward branch, start at the $FF=second byte of the branch and subtract one for each of the above. Thus, if `BNE ONE10` branches back 21 bytes, start at FF (the second byte of `BNE`), and move back in the following manner: FF, FE, FD, FC, FB, FA, F9, F8, F7, F6, F5, F4, F3, F2, F1, F0, EF, EE, ED, EC to EB (first byte of `LDA`). The machine language commands would look like this:

```
8E0400     HUNDRD LDX    #$400   POINT TO SCREEN
108E0000          LDY    #0      SET CHANGE FLAG TO 0
A6XX       ONE10  LDA    ,X+       GET FIRST ENTRY
A1XX              CMPA   ,X        COMPARE TO I+1
230A              BLS    ONE70     GO IF ENTRY I GE ENTRY I+1
E6XX              LDB    ,X        GET SECOND ENTRY
E7XX              STB    -1,X      SWAP B TO A
A7XX              STA    ,X        SWAP A TO B
108E0001          LDY    #1        SET "CHANGE"
8C05FF     ONE70  CMPX   #$5FF     TEST FOR SCREEN END
26EB              BNE    ONE10     GO IF NOT ONE PASS
108C0000          CMPY   #0      TEST CHANGE FLAG
26DE              BNE    HUNDRD  GO IF CHANGE OCCURRED
```

Now we can fill in the second byte of the *indexed* instructions. These are a bit tricky. You must note what type of indexing is being used and whether there's a displacement value. You must also code in the index register field, RR. Here the code value for the index register is 00, for X. The trickiest coding is for the `STB -1,X`, which is coded as 00011111. The RR register code is 00, so the result is 00011111. The five-bit field holds the displacement value of 111111, equal to -1 in two's complement notation.

```
8E0400     HUNDRD LDX    #$400   POINT TO SCREEN
108E0000          LDY    #0      SET CHANGE FLAG TO 0
A680       ONE10  LDA    ,X+       GET FIRST ENTRY
A184              CMPA   ,X        COMPARE TO I+1
230A              BLS    ONE70     GO IF ENTRY I GE ENTRY I+1
E684              LDB    ,X        GET SECOND ENTRY
E71F              STB    -1,X      SWAP B TO A
A784              STA    ,X        SWAP A TO B
108E0001          LDY    #1        SET "CHANGE"
8C05FF     ONE70  CMPX   #$5FF     TEST FOR SCREEN END
26EB              BNE    ONE10     GO IF NOT ONE PASS
108C0000          CMPY   #0      TEST CHANGE FLAG
26DE              BNE    HUNDRD  GO IF CHANGE OCCURRED
```

Finding a Place for the Code

Now that we have the code, we need to know where to put it. If we use assembly language code with BASIC, we must place the code out of harm's way. We don't want BASIC to clobber the machine language bytes as it stores variables or internal variables. One way to do this is by using the `CLEAR` command in BASIC. This command allocates string space and protects a block of memory. For example, `CLEAR 300,&H3EFF` allocates 300 bytes of string space and protects all memory above $3EFF — just a little under the 16K point. There's still enough room for BASIC to function in the memory under this point.

There are other places we *could* put the machine language bytes (such as in the middle of large arrays or in strings), but this is the safest place — a place that will never be touched by BASIC.

Now that we know where the machine language bytes go, we can assign locations to each of the instructions. Because some instructions refer to absolute memory locations (such as `LDA CONSNT`, instruction locations should be assigned *after* making the skeleton of instruction lengths. We are going to do it now. (We are lucky that the program above is relocatable anywhere in memory — it contains no absolute addresses.)

We can see from the code shown in Figure 2 that the machine language bytes occupy memory from $3F00 to $3F21. Now, how do we get them there? Assuming that we're

```
3F00  8E0400     HUNDRD  LDX    #$400   POINT TO SCREEN
3F03  108E0000           LDY    #0      SET CHANGE FLAG TO 0
3F07  A680       ONE10   LDA    ,X+       GET FIRST ENTRY
3F09  A184               CMPA   ,X        COMPARE TO I+1
3F0B  230A               BLS    ONE70     GO IF ENTRY I GE ENTRY I+1
3F0D  E684               LDB    ,X        GET SECOND ENTRY
3F0F  E71F               STB    -1,X      SWAP B TO A
3F11  A784               STA    ,X        SWAP A TO B
3F13  108E0001           LDY    #1        SET "CHANGE"
3F17  8C05FF     ONE70   CMPX   #$5FF     TEST FOR SCREEN END
3F1A  26EB               BNE    ONE10     GO IF NOT ONE PASS
3F1C  108C0000           CMPY   #0      TEST CHANGE FLAG
3F20  26DE               BNE    HUNDRD  GO IF CHANGE OCCURRED
3F22
```

Figure 2

going to be working in BASIC, we can use the BASIC `POKE` statements to move any type of data anywhere we want within the 64K addressing space of BASIC. The easiest way to do this is to list the data in `DATA` statements and then to use a loop to move the data:

```
900 CLEAR 300, &H3EFF
1000 DATA &H8E,&H04,&H00,&H10,&H8E,&H00, &H00,
&HA6
1001 DATA &H80,&HA1,&H84,&H23,&H0A,&HE6, &H84,
&HE7
1002 DATA &H1F,&HA7,&H84,&H10,&H8E,&H00, &H01,
&H8C
1003 DATA &H05,&HFF,&H26,&HEB,&H10,&H8C, &H00,
&H00
1004 DATA &H26,&HDE
1010 FOR I = &H3F00 TO &H3F21: READ A: POKE I, A:
NEXT
```

The loop at Line 1010 moves the 22 bytes of data into the $3F00 protected area.

Next, now that we have the machine language code there, how do we get to it? Here again, BASIC has the answer. The `DEFUSR` statement defines where the code is. There's an ID number attached to this statement so it becomes `DEFUSR0` - `DEFUSR9`, but since we have only one machine language program we'll use `DEFUSR0`. Once defined, the code is called by a `USR0` statement, which tells the BASIC interpreter to use the defined location and transfer control to the machine language program found there:

```
900 CLEAR 300, &H3EFF
1000 DATA &H8E,&H04,&H00,&H10,&H8E,&H00, &H00,
&HA6
1001 DATA &H80,&HA1,&H84,&H23,&H0A,&HE6, &H84,
&HE7
1002 DATA &H1F,&HA7,&H84,&H10,&H8E,&H00, &H01,
&H8C
1003 DATA &H05,&HFF,&H26,&HEB,&H10,&H8C, &H00,
&H00
1004 DATA &H26,&HDE
1010 FOR I = &H3F00 TO &H3F21: READ A: POKE I, A:
NEXT
1020 DEFUSR0 = &H3F00
1030 A+USR0(0)
1040 GOTO 1040
```

We are now all set to call the program, or are we? Once the program is executed, what will happen? The last instruction was a `BNE`. It branches back to the beginning of the bubble sort if the data is not sorted. However, if the data *is* sorted, the next instruction in sequence is executed. But there is no next instruction. Since the next instruction will be garbage, the program will probably blow up in some strange loop after the sort is done.

After the sort let's return to a BASIC calling program by

Burke & Burke

P.O. Box 1283 Palatine, IL 60078-1283

(312) 397-2898

RAINBOW CERTIFICATION SEAL

Our Famous Hard Disk Interface

We've sold hundreds of our affordable, high-performance CoCo XT and CoCo XT-RTC hard disk interfaces to a very hot Color Computer market in a single year! This year, 1988, is "The Year of the Hard Disk" at Burke & Burke.

The CoCo XT hard disk interface lets you connect up to 2 low cost, PC compatible 5-120 Megabyte capacity hard drives to your CoCo. You buy the drive, Western Digital WD1002-WX1 or WD1002-27X (RLL) controller, and a case from the PC dealer of your choice. Just plug them into the CoCo XT, plug the CoCo XT into your Multi-PAK, and you have a 20 Meg OS9 hard disk system for **under $450!**

Great for multi-user systems! The CoCo XT interface uses advanced "NO HALT" hard disk controllers, which do not halt your CoCo and do not disable or use interrupts during hard disk access. You get full type-ahead, and the system clock does not lose time during hard disk access. Fully compatible with most RS-232 expansion ports!

CoCo XT (with anodized housing, 60 page user manual, hard disk back-up utility and new, Version 2.3 drivers for use with both OS9 & HYPER-I/O) – $69.95. Or choose the **CoCo XT-RTC** (includes real-time clock / calendar with battery backup) -- $99.95

THE PROFESSIONAL TOUCH: XT-ROM – Automatically boots and reboots OS9 from hard disk. Installs in your hard disk controller's BIOS ROM socket -- $19.95.

Now: Hard Disk for BASIC

"Dynamic Disk Interface" runs hard drives, big floppies, and more!

You or someone that you know may have the 35 Track Blues. It strikes hundreds of CoCo users every year. One day you wake up, and say to yourself, "These 35 track floppy disks are just too small."

There's only one cure. More storage. Get it. With HYPER-I/O, from Burke & Burke.

BASIC for the '90's

HYPER-I/O modifies the RS-DOS Disk BASIC in your CoCo 1, 2, or 3 to provide a "Dynamic Disk Interface". Use your existing BASIC and RS-DOS software with hard disk interfaces (CoCo XT, DISTO), RAM Disks, and any mix of floppy drives from 160K to 720K each. Fully RESET protected, user configurable, expandable, OS9 compatible, EPROM-able HYPER-I/O may soon be **THE** system of choice for the CoCo 1, CoCo 2, and CoCo 3. **HYPER-I/O Version 2.5** now available for only $29.95.

HYPER-III (RAM Disk and Print Spooler for CoCo 3 HYPER-I/O) –$19.95

Shipping (within the USA) CoCo XT $2.00; Disk or ROM $1.50. COD's add $2.20.

Looking for "The Answer"?

Gain access to the vast warehouse of information stored in your "non-conscious" mind through your computer keyboard.

There are mini-programs or circuits in everyone's "non-conscious" mind which will enable them to accomplish remarkable things. In order to utilize these mini-programs, a bridge of communication must be established between the conscious and the "non-conscious" parts of the mind. Six years of research and development have resulted in a proven aid for establishing this bridge.

"The Answer" is a software package which aids you in communicating with your "non-conscious" mind to solve questions and difficult problems in a question/answer format. It utilizes graphics and optional user-programmable subliminal messages to strengthen the communication bridge.

Ask your questions...seek the answers...*EXTERNALIZE THE RESULTS* via automatic disk-stored record and optional print-out.

Order now for only $29.95 (+ $3.00 S/H) No COD's.

"Turn on your computer and turn on the power of your mind!"

MasterCard VISA

CALL (317) 962-6644 TO ORDER
Alpha - Biotechnologies, Inc.
P.O. Box 2203 • Richmond, IN 47375

RAINBOW CERTIFICATION SEAL

using a stack (described last month). The stack saves the return address of a control point in the BASIC interpreter. We can pop that return address by including a 6809 RTS (Return from subroutine) instruction as the *last* instruction of the machine language code as shown in Figure 3.

> ***"Assembly language is tedious, and it is hard to learn. But if you want to do things that you just can't do in compiled languages, assembly language is the only way to go."***

We'll have to include that in the storage portion of the BASIC program as well:

```
900 CLEAR 300, &H3EFF
1000 DATA &H8E,&H04,&H00,&H10,&H8E,&H00, &H00,
&HA6
1001 DATA &H80,&HA1,&H84,&H23,&H0A,&HE6, &H84,
&HE7
1002 DATA &H1F,&HA7,&H84,&H10,&H8E,&H00, &H01,
&H8C
1003 DATA &H05,&HFF,&H26,&HEB,&H10,&H8C, &H00,
&H00
1004 DATA &H26,&HDE,&H39
1010 FOR I = &H3F00 TO &H3F22: READ A: POKE I, A:
NEXT
1020 DEFUSR0 = &H3F00
1030 A = USR0(0)
1040 GOTO 1040
```

Now we *are* all set to run the sort. The USR0 will transfer control to the machine language code; the screen sort will be done; the RTS will return control to BASIC. BASIC will execute the next instruction after the USR0 that is, in this case, a continual loop so screen result is not disturbed.

If you run this code, you'll see a rapid sort of the screen. This is several times faster than the equivalent BASIC code, and *speed* is the reason that assembly language is used.

Assembler Assembling

You can see that it is possible to hand assemble machine language code. However, it's very tedious. Grace Hopper, the major force behind COBOL, says that it's almost impossible to assemble a string of 40 ones and zeroes and not make a mistake. For this reason, it's much easier to assemble the code automatically. The symbolic code:

```
HUNDRD  LDX   #$400   POINT TO SCREEN
        LDY   #0      SET CHANGE FLAG TO 0
ONE10   LDA   ,X+       GET FIRST ENTRY
        CMPA  ,X        COMPARE TO I+1
        BLS   ONE70     GO IF ENTRY I GE ENTRY I+1
        LDB   ,X        GET SECOND ENTRY
        STB   -1,X      SWAP B TO A
        STA   ,X        SWAP A TO B
        LDY   #1        SET "CHANGE"
ONE70   CMPX  #$5FF     TEST FOR SCREEN END
        BNE   ONE10     GO IF NOT ONE PASS
        CMPY  #0      TEST CHANGE FLAG
        BNE   HUNDRD  GO IF CHANGE OCCURRED
        RTS           RETURN TO BASIC
```

is entered into the assembler program. This *source code* is the actual assembly language. The assembler then proceeds in the same way that we proceeded in hand assembling. It makes one pass through the lines of code, allocates space for

```
3F00  8E0400    HUNDRD  LDX   #$400   POINT TO SCREEN
3F03  108E0000          LDY   #0      SET CHANGE FLAG TO 0
3F07  A680      ONE10   LDA   ,X+       GET FIRST ENTRY
3F09  A184              CMPA  ,X        COMPARE TO I+1
3F0B  230A              BLS   ONE70     GO IF ENTRY I GE ENTRY I+1
3F0D  E684              LDB   ,X        GET SECOND ENTRY
3F0F  E71F              STB   -1,X      SWAP B TO A
3F11  A784              STA   ,X        SWAP A TO B
3F13  108E0001          LDY   #1        SET "CHANGE"
3F17  8C05FF    ONE70   CMPX  #$5FF     TEST FOR SCREEN END
3F1A  26EB              BNE   ONE10     GO IF NOT ONE PASS
3F1C  108C0000          CMPY  #0      TEST CHANGE FLAG
3F20  26DE              BNE   HUNDRD  GO IF CHANGE OCCURRED
3F22  39                RTS           RETURN TO BASIC
3F23
```

Figure 3

each instruction and assigns opcodes. It also builds a symbol table of all labels and symbols in the code. The symbol table for this code would look like this:

```
HUNDRD        $3F00
ONE10         $3F07
ONE70         #3F17
```

The assembler now makes a second pass and fills in opcodes, displacements, and absolute addresses. The result is *object code* that looks much like the machine language code we generated. This object code is usually loaded by a *loader*, resulting in true machine language code — ones and zeroes.

If you understand what's happening in the process above, the assembler won't pose any problems for you. Assemblers have a few more commands called *pseudo-operations* or *pseudo-ops* that allow you to define the origin of the program, allocate space for constants or define constants, define text strings, etc., but these are relatively easy to understand.

As I mentioned in the previous column, one of the best assemblers for the CoCo was Disk *EDTASM*. I say *was* because Radio Shack has discontinued it. Disk *EDTASM* was like *Turbo PASCAL* for the PC compatibles — it operated in a highly interactive environment that allowed you to edit a program, quickly assemble it *in memory* and then debug the assembled code, all in the same program. It was a one-step process. If you want to learn assembly language, I suggest that you look for a copy of this. Once you *know* assembly language, the assembler you use is not as critical, but Disk *EDTASM* is a great learning tool.

A Second Example

Let's try a second example:

```
100 CLS 110 X = 16: Y = 8
120 DX = 1: DY = 1
130 L = &H400 + 8 * 32 + 16
140 X = X + DX
150 Y = Y + DY
160 IF ( X < 0 OR X > 31 ) THEN DX = -DX: X = X + DX
170 IF ( Y < 0 OR Y> 14 ) THEN DY = -DY: Y = Y + DY
180 POKE &H400 + L, 96
190 L = Y * 32 + X
200 POKE &H400 + L, 79
210 GOTO 140
```

This BASIC code clears the text screen and then moves an 'O' around inside the screen on a diagonal path. As the 'O' is moved, the old position is erased. The effect is like the cursor in an old *Pong* game — the cursor bounces around within the screen.

As in the first example, each poke is used to set characters on the screen directly. Character 96 is a space, which clears the character position. Character 79 is an uppercase 'O'. Variable `X`, the column, varies from 0 to 31. Variable `Y`, the row, varies from 0 to 14. Using up to 15 rows traces the same path, and the display is not very interesting.

The variables `DX` and `DY` are the increments to add to `X` and `Y`. At the start, the increments are one and one, which results in the movement of one character position over and one down. When Character O hits the side of the screen, however, one or both of the increments are changed by negation. This changes the direction of the move. Both change at a corner.

How would this be coded in assembly language? The assembly language program for this is shown in Listing 1. It follows the same logic as the BASIC program. As you can see, this is an *EDTASM+* (Disk *EDTASM*) listing. The source code (the text) contains the pseudo-op `ORG` to set the origin to $3F00 and several `FCB` pseudo-ops to initialize variables. Otherwise, you'll find it easy to follow. The listing also includes absolute addresses in some of the instructions, unlike our first example. Variables `XR`, `YR`, `DX`, and `DY` are located in absolute addresses.

The BASIC code for the program is shown in Listing 2. It uses the same scheme of relocation by `DATA` values we used in the first example. There is no `RTS`; however, the display runs continuously (reset to regain control). If you run the program, you'll be amazed — nothing shows up on the screen. Why?

This program is so much faster than the BASIC version that the 'O' is moving too fast to be seen. If you don't believe me, substitute `&H12, &H12` for the `&HA7, &H84` in Line 180. This will prevent the old character from being erased. Now when you run the program you see the screen fill up with O's as the "cursor" moves around the entire screen in the wink of an eye.

This is a very brief introduction to assembly language. Assembly language is tedious, and it is hard to learn. But if you want to do things that you just can't do in compiled languages, assembly language is the only way to go.

See you next month with more CoCo topics. ☐

THE BEST COCO ASSEMBLY LANGUAGE PROGRAMMING BOOKS IN PRINT

"Assembly Language Programming for the CoCo" (The Book) and the CoCo 3 (The Addendum). Professionally produced (not just skimpy technical specifications). THE CoCo reference books.

THE BOOK - 289 pages of teaching assembly language for the CoCo 1 & 2. It's used as a school text and is an intro to Computer Science. It describes the 6809E instructions, subroutines, interrupts, stacks, programming philosophy, and many examples. Also covered are PIAs, VDG, SAM, kybd, jystk, sound, serial port, and using cassette and disk. $18.00 + $1.50 s/h.

THE ADDENDUM - Picks up where the BOOK left off. Describes ALL the CoCo 3 enhancements & how to use them with assembly language. The most complete GIME spec. WOW - Super-Res Graphics, Virtual Memory, New Interrupts, and more information not available elsewhere. Find out what the CoCo 3 can really do. $12.00 + $1.00 s/h.

COCO 3 SPECIAL Start your CoCo library right. See what the CoCo can really do and save money - buy the BOOK and ADDENDUM for only $27.00 + $2.00 s/h.

US check or money order. RI orders add 6% sales tax

TEPCO
68 James Court
Portsmouth, RI 02871

See Us On DELPHI

Listing 1: PONGBIN

```
3F00                00100          ORG   $3F00
3F00 8E     0510    00110 PINGPO   LDX   #$0510   X=16, Y=8
3F03 B6     3F4F    00120 PPM      LDA   XR       X
3F06 BB     3F51    00130          ADDA  DX       X=X+DX
3F09 2C     06      00140          BGE   PP1      GO IF GE 0
3F0B 70     3F51    00150          NEG   DX       FLIP X DIRECTION
3F0E BB     3F51    00160          ADDA  DX       BACK
3F11 81     1F      00170 PP1      CMPA  #31      TEST
3F13 2F     06      00180          BLE   PP2      GO IF GT 31
3F15 70     3F51    00190          NEG   DX       FLIP X DIRECTION
3F18 BB     3F51    00200          ADDA  DX       BACK
3F1B F6     3F50    00210 PP2      LDB   YR       SAME FOR Y IN B
3F1E FB     3F52    00220          ADDB  DY
3F21 2C     06      00230          BGE   PP3
3F23 70     3F52    00240          NEG   DY
3F26 FB     3F52    00250          ADDB  DY
3F29 C1     0E      00260 PP3      CMPB  #14
3F2B 2F     06      00270          BLE   PP4
3F2D 70     3F52    00280          NEG   DY
3F30 FB     3F52    00290          ADDB  DY
3F33 B7     3F4F    00300 PP4      STA   XR       STORE NEW X
3F36 F7     3F50    00310          STB   YR       STORE NEW Y
3F39 86     60      00320          LDA   #96      BLANK
3F3B A7     84      00330          STA   ,X       ERASE OLD
3F3D 86     20      00340          LDA   #32      A=32,B=Y
3F3F 3D             00350          MUL            Y*32
3F40 F3     3F4E    00360          ADDD  XR-1     Y*32+X
3F43 C3     0400    00370          ADDD  #$400    ADD START OF SCREEN
3F46 1F     01      00380          TFR   D,X      NOW IN X
3F48 86     4F      00390          LDA   #79      O
3F4A A7     84      00400          STA   ,X       IN NEW POSITION
3F4C 20     B5      00410          BRA   PPM      CONTINUOUS LOOP
3F4E        00      00420          FCB   0
3F4F        10      00430 XR       FCB   16       MUST BE 16 BITS
3F50        08      00440 YR       FCB   8
3F51        01      00450 DX       FCB   1
3F52        01      00460 DY       FCB   1
            0000    00470          END

00000 TOTAL ERRORS
```

Listing 2: PONGBAS

```
100 CLEAR 300,&H3EFF
110 DATA &H8E,&H05,&H10,&HB6,&H3
F,&H4F,&HBB,&H3F
120 DATA &H51,&H2C,&H06,&H70,&H3
F,&H51,&HBB,&H3F
130 DATA &H51,&H81,&H1F,&H2F,&H0
6,&H70,&H3F,&H51
140 DATA &HBB,&H3F,&H51,&HF6,&H3
F,&H50,&HFB,&H3F
150 DATA &H52,&H2C,&H06,&H70,&H3
F,&H52,&HFB,&H3F
160 DATA &H52,&HC1,&H0E,&H2F,&H0
6,&H70,&H3F,&H52
170 DATA &HFB,&H3F,&H52,&HB7,&H3
F,&H4F,&HF7,&H3F
180 DATA &H50,&H86,&H60,&HA7,&H8
4,&H86,&H20,&H3D
190 DATA &HF3,&H3F,&H4E,&HC3,&H0
4,&H00,&H1F,&H01
200 DATA &H86,&H4F,&HA7,&H84,&H2
0,&HB5,&H00,&H10
210 DATA &H08,&H01,&H01
220 FOR I=&H3F00 TO &H3F52: READ
 A: POKE I,A: NEXT I
230 FOR I=&H3F00 TO &H3F52: PRIN
T HEX$( PEEK( I ) );" ";: NEXT I
240 CLS
250 DEFUSR0 = &H3F00
260 A = USR0( 0 )
```

Accessible Applications

Introducing the OS-9 Team

By Richard A. White
Rainbow Contributing Editor

Last month, we discussed some general operating system ideas and the ways in which OS-9 differed from them. All operating systems must connect the computer's computing and memory areas to its input and output components. An operating system provides the connections to the outside world. Most operating systems hide this connecting code in a program that is loaded when the computer is booted.

Because you seldom need to know this code, you would not need to know its location. There is a problem, however, if the operating system is not set up for new hardware you want to add.

One solution to this problem is buying a new version of the operating system. Owners of MS-DOS machines have done this many times. ("Want a hard disk? Fine. But Version 2.1 of DOS won't work with this. A 3.1 will work just fine. $50 please. You only have 256K of RAM? That's a little small for Version 3.1. Oh, it will fit fine, but nothing else will fit with it. For $250 we have this memory upgrade board to take you to 640K.")

OS-9 was designed to handle such situations without causing the trauma that other systems cause. Higher-performance options are not quite free, but the cost is compensated by the intellectual challenge. OS-9 can be altered so easily because the user can get to each of the operating system modules and change or replace them, or add others. In this article, we will discuss why and how you make changes in your OS-9 system.

Modules

There is a distinction between user and system modules. While user modules are loaded and used after booting a system, system modules are included in the kernel and boot files. Kernel files contain the programs that start and manage the system's operation. Input and output (I/O) files communicate with attached hardware. All system modules should be in the kernel or in `OS9Boot`. As we go along, note which modules should be in `OS9Boot` and which should not. Under Level II, the kernel includes `REL`, `Boot`, `OS9p1`, `OS9p2`, `Init`, `CC3Go` and `Clock`. The first three are stored on Track 34 of the boot disk and are loaded when you type `DOS` to start up OS-9. `REL` resets the system hardware, prepares it for OS-9 and calls `OS9p1`. `OS9p1` initializes the system, and `Boot` loads `OS9Boot`.

`Init`, `OS9p2`, `CC3Go` and `Clock` must be in your `OS9Boot` file. `Init` is not a program. It is a data module containing system constants. `OS9p2` handles memory management, the module directory and functions associated with module management, and process control. This is the heart of multitasking capability in OS-9. `CC3Go` now loads *Shell* and *GrfDrv*, establishes communications with *Shell* and starts the `StartUp` file.

Shell handles communication between you and the computer. The program interprets commands that are typed in and calls the proper operating system code to execute them. Though not part of the operating system, it may be considered an application program that interfaces with the operating system. *Shell* is designed to be loaded separately from `OS9Boot` as is *GrfDrv*. Do *not* put either of these into your `OS9Boot`.

Shell's input may come from sources other than the keyboard. Input can also be redirected from any source managed by OS-9. Typically, alternate input comes from a disk file containing commands identical to those typed from the keyboard. The `StartUp` file is one such disk file. But `CC3Go` automatically starts the process of reading this file on boot. *Shell* interprets commands from `StartUp` as if they had been typed. A simple `StartUp` file provided with OS-9 sends a welcome message to the screen and runs `Setime` to set `Clock` to the present date and time. `StartUp` can be quite long. Mine exceeds 50 lines.

Richard White lives in Fairfield, Ohio, has a long background with microcomputers and specializes in BASIC *programming. With Don Dollberg, he is the co-author of the* TIMS *database management program.*

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette or disk) to:

THE RAINBOW
One-Liner Contest
P.O. Box 385
Prospect, KY 40059

Managers and Submanagers

We have discussed some of the OS-9 modules that get things started, but other modules that have been involved deserve our attention. The `StartUp` file was read in. The modules that manage system startup need help reading it. The `Boot` module contains enough code to find and read in `OS9Boot`, but any other disk access is beyond its capability. It finds `OS9Boot` by its length. `Boot` reads sectors in sequence looking for `OS9 Boot`'s length. If `OS9Boot` were split into two parts, `Boot` would be defeated. `StartUp` may be anywhere on the disk and may be split into separated sectors. A more competent disk handler than `Boot` is needed.

> ***"OS-9 can be altered so easily because the user can get to each of the operating system modules and change or replace them, or add others."***

All data transfer from and to the computer's hardware (drives, printer and terminal) is managed by the I/O manager called `IOMan`. In addition, `IOMan` takes care of communications between processes — tasks that do not involve hardware but have functional similarities. To accomplish its role, `IOMan` uses three submanagers that are designed to handle different types of communications.

The simplest type of communication is a stream of characters. The keyboard generates such a stream, which is irregular and unpredictable in terms of when characters are sent and how characters are grouped. The computer deals with the characters one at a time as they are presented to it. This stream is called a sequential character file and its submanager is named `SCF`. The screen, printer and modem are also `SCF` devices. `SCF` can handle any number of these devices and is limited only by what can be attached to a CoCo.

Disk drives are organized into blocks of data called sectors. When a disk is read, a block of data of known size (256 bytes on the CoCo) is loaded in. A block of memory must be received, stored in a defined area of memory (the buffer). It must then be read (out of the buffer), as needed, to the using application in the character stream. Because the sectors containing the required data may be distributed at random locations on the disk, the submanager must read the disk's file allocation table and determine the sectors and the order it needs to call. This submanager's basic function is to handle random blocks. The submanager's name, `RBF`, refers to random block files.

`RBF` manages any storage device based on blocks of data, including floppy disks, hard drives and RAM disks. Compare this with `Boot`'s disk access code that reads in `OS9Boot`. `Boot` can only find where `OS9Boot` starts on a disk and the number of contiguous sectors it occupies. If `OS9Boot` is divided into parts that are at different locations on a disk, `Boot` cannot operate. For this reason, always use a newly formatted disk to make a new boot disk so that `OS9Boot` will *not* be saved in two places.

Communications between processes have complexities all their own. The sending process cannot generate data faster than the receiving process can handle it. The submanager controlling the process must know the needs of the receiving process and control the sending process so that it does not exceed these needs. In this respect, this submanager is like `RBF`, which ensures that the data rate does not exceed the storage rate of the storage device. However, there is no block organization to the data. The process of transferring data from one operating process to another is called piping; therefore, the submanager is named `PipeMan`.

Drivers

Human managers organize, direct and control, but seldom do any of the actual work that makes something happen. OS-9 managers and submanagers are no different. Their management duties are all they can handle, and they need help carrying out their functions. Their helpers are called drivers, and these do the actual work of transferring data to and from processes and hardware.

The standard device drivers supplied with OS-9 are `CC3IO` (handles the terminal functions), `CC3Disk` (handles floppy disks), `Piper` (works with pipes), `Printer`, `RS-232` and `Modem`. `ACIAPAK` replaces `RS-232` if you use the RS-232 in your Multi-Pak Interface. Most specialized hardware use special drivers. The hard disk, for instance, requires an additional driver. Like CC3Disk, this driver works with RBF.

If the basic OS-9 design philosophy is followed, a driver can handle a variety of similar devices having different characteristics. Floppy drives, for example, have changed drastically in the last eight years. When the first CoCo came out, a 5¼-inch drive was typically a single-sided, single-density, 35-track device that stored less than 100K. The first CoCo drive added double-density, 156K storage. A friend who owned a Model I told me I would only need four or five disks because of their large capacity. I almost believed him.

A couple of years later, double-sided, 40-track drives were standard on IBM PC's. Now single-sided drives are not even made, and 3½-inch drives that store 720K are common.

When Radio Shack brought out OS-9 Level I for the CoCo, it must have believed my friend. The disk driver was hard-coded to use 35-track, single-sided disks only. This change in OS-9 design made it impossible to use larger drive capacities with the stock driver. How should it have been done?

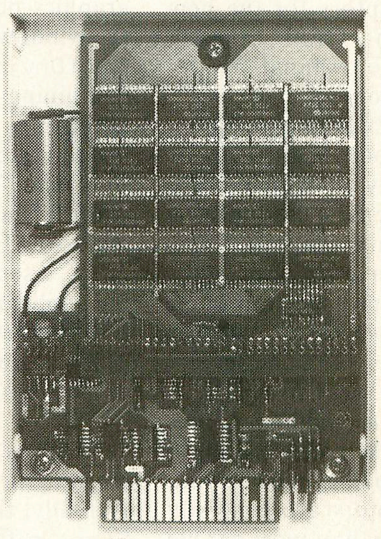
With OS-9, the driver obtains the characteristics of a device from a data module (a device descriptor) each time it needs to access that device. This is what Level II CC3Disk does. The device descriptors carry the names used to call the drive. If you want to load a program in the CMDS directory on disk 1, you type `LOAD/D1/CMDS/MYPROG`. *Shell* interprets this request and sends it to RBF, which works with CC3Disk to load the file. A first step is to read the drive characteristics from the device descriptor module, D1.

The characteristics stored in a device descriptor are the maximum capabilities of the drive. They tell OS-9 nothing about how the disk in that drive is formatted. The specifics about the disk itself are read from the disk and compared with the capacity given by the descriptor. As long as the disk characteristics are equal to or less than those reported by the descriptor, the disk can be read and written. So a 35-track, single sided disk works just fine in a 40-track, double-sided drive.

As noted, Level II comes with CC3Disk, which uses its device descriptors to determine the capabilities of each drive. It also comes with various pre-made device descriptors covering some of the more popular drive choices. Not all possible descriptors are provided, and Murphy's Law requires that at least one that you want will not be there. For example, there is no 40-track single-sided descriptor. If you have such a drive, you can use the 35-track descriptor but not use the last five tracks. There are descriptors for the current standard 5¼-inch drive, which is 40-track, double-sided with a 6-ms step rate.

One of the favorite pastimes of OS-9 addicts is hacking the code. That means changing modules to make them better (though a pessimist, in a fit of kindness, might say to make them different). This has led to all sorts of patches, modified modules, rewritten modules and programs to do some of this. OS-9's database on Delphi is full of such information. Some of the information is quite useful. One in particular, *DMode* by Kevin Darling, provides a way to patch a module that is on a disk. With *DMode* and information in the OS-9 manuals, you can make any device descriptor you need.

Programs to make device descriptors



SolidDrive™ by Vidicom Corp

SolidDrive™ - a ramdisk that doesn't forget! Fully Static, battery backed CMos ram makes SolidDrive™ ready to use instantly. You can forget formatting and copying work files to ramdisk then copying back your changes to floppy. You can forget fear of power failures. The instant power loss occurs, SolidDrive™ write-protects itself and your valuable work. SolidDrive™ gives you state-of-the-art surface mount technology. That's why we have the best guarantee in the industry - Two years limited repair or replacement! SolidDrive™ is compatible with Multi-Pak® and comes complete with OS9® Level I or II device driver, formatter and self-test software. Available in 512K and 1 Megabyte versions. Factory upgrades available for 512K version. RSDos Driver now available, treats SolidDrive™ as 3 or 6 SSSD RS devices (4-6,4-9), Disk loaded version free on request! 27C64 EProm version $19.00

SolidDrive™ by Vidicom Corp
512K (524,288 bytes) $395.00
1 Meg (1,048,576 bytes) $695.00
Please add $4.00 shipping
Arizona Residients add 5.5% Sales tax
Visa MasterCard orders welcome

SolidDrive™ is the fastest, most reliable long-term storage available to the small computer user!

Vidicom Corp 20 E. Main St. Suite 710
Mesa, AZ 85201 (602) 827-0107
Hours M-F 9:00 am - 5:00 pm MST

OS9 is the trademark of Microware Systems Inc and Motorola Inc. Multi-pak is the trademark of Tandy Corp.

E.Z. FRIENDLY

RAINBOW CERTIFICATION SEAL

For Your CoCo 1, 2, & 3

Leonardo's PenciL

(Reviewed in Oct. 87 RAINBOW) Makes programming sensational-looking graphics as easy as moving a joystick! Converts precision drawings into "DRAW" commands which can be stand-alone BASIC programs or merged into other programs. Also includes "DEMO" and "PAINT" programs. Requires a spring-centered joystick or touch-pad. 32k ECB **tape or disk $14.95**

?ENIGMA?

Transform your computer into an ultra-secret code machine capable of enciphering and deciphering in over 12 million virtually unbreakable codes! (not simple substitution codes). Print hard copy or store & retrieve coded data on tape or disk. Only the person who has the password can read it! 32k ECB **tape or disk $12.95**

New! EZ Writer

Just answer the prompts & type your message; "EZ WRITER" will put it into perfect letter form and send it to your DMP or DWP. Professional-quality, 1 to 4 page letters every time! Do one letter or multiple copies for "personalized" mailings. Saves letters and mailing lists. Even does labels. Menu-driven. Undoubtedly the EZ-est letter writing system available! Free sample on request! 32k ECB **tape or disk $19.95**

MATH GAMES ✓

FOUR superior educational "games": "RACEWAY", "GO TO THE TOP" (multiplication tables drill), "WORD PROBLEMS", & "PYRAMID". Covers addition, subtraction, multiplication, & division. Different levels of difficulty. Exciting graphics & sounds. EZ and fun! 32k ECB **tape or disk $19.95**

KEYBOARD COMMANDER

Probably the most exciting typing tutor available for your CoCo. You are the commander of a space ship & it's your job to shoot down alien letters & words as they speed toward you & attack your spaceship. Exciting Hi-Res action! 32k ECB **tape or disk $24.95**

E.Z. FRIENDLY SOFTWARE
118 CORLIES AVE. • POUGHKEEPSIE, NY 12601 • (914) 485-8150
(Add $1.50 s/h to all orders. NY residents add state sales tax.)

are included in commercial packages such as *SDisk*. There are ways to do whatever is needed. When I installed my 3½-inch drive, I only needed to make a device descriptor and a new `OS9Boot` that included the descriptor.

`CC3Disk` cannot manage a hard drive, so a new driver is needed. Hard drive suppliers provide drivers with their packages and descriptors when appropriate. The user must make a new `OS9Boot`, which includes these modules, and proceed with the installations — it takes a little more than just a new boot. Burke & Burke began by providing only an interface and software, leaving users to supply their own hard drive. Thus, a wide variety of drives can be used. To solve the descriptor problem, Chris Burke wrote a program to make a descriptor that matches the drive used. This is fine for a person who can get a real deal on an older drive and the data to make the descriptor. However, it is a problem for the nontechnical person. Burke & Burke now provides a complete package.

Next we have `Printer` and its descriptor `P`, which drives a printer through the serial port. Unless you have a very old printer, you will want to run it faster than the 600-baud default rate. OS-9 provides `Xmode` to change `SCF` descriptors. Initially, run `Xmode` at the beginning of a session by typing `Xmode /p baud=4` to run at 2400 baud. (I have a serial-to-parallel converter, so I use `Xmode /p baud=6` and work at 9600 baud.) Next, automate the procedure by putting the `Xmode` statement in your `StartUp` file. It will look exactly as you would type it from the keyboard, but it takes a few seconds for `Xmode` to load and run — a waste of precious time. So, the final step in the automation is to make a new boot using `P` after you have changed it with `Xmode`. (More about that in a later column.

Use `Xmode` to change the 300-baud default of T1 or T2 as well. These descriptors work with `RS-232` and the serial port, or the `ACIAPAK` and the RS-232 Pak respectively.

The last I/O system to be discussed is the terminal made up of your keyboard and your video display. In Level I, this was pretty simple. It consisted of the driver `CCIO` and the device descriptor `TERM`. With the arrival of the CoCo 3, a number of people wrote 80-column drivers, which were made available on information services like Delphi and allowed us to use the 80-column screen before the release of OS-9 Level II. Here, again, new hardware required only a new driver and a new device descriptor.

OS-9 Level I does not provide graphics support, but the BASIC09 package for Level I supplies a graphics interface module, `Gfx`. This is an assembly language program that handles both color graphics and joystick functions. `Gfx` is loaded, either before running BASIC09 or by a `Shell` statement in the program, and then called by the program with the BASIC09 `RUN` statement. Like *Shell*, `Gfx` can be viewed as an applications program that interfaces with the operating system. Remember that all applications programs must be loaded separately and never be put into your `OS9Boot`.

One of the real strengths of OS-9 Level II is its windowing and graphics capabilities. The windowing capability coupled with multitasking sets OS-9 apart from all other microcomputer operating systems. (The much ballyhooed OS-2 for PC Compatibles lacks windowing, though windows will be provided by either Microsoft *Windows* or IBM's *Presentation Manager*.)

The modules involved in windows and graphics fit into the OS-9 pattern. As always, there is a driver, `CC3IO`, and a number of device descriptors. Each active window needs a separate device descriptor, but you can have more descriptors in your boot than you have active windows. In fact, you should so there are free descriptors for the new windows you open. Think of each window as a separate terminal, available to run its own program.

Two basic window device descriptors should be in your boot: `TERM`, a 32- or 40-character display in which OS-9 boots up, and `W`, a generic descriptor is not used alone to run a window.

Your OS-9 option may have additional window descriptors in your boot, generally named `W1`, `W2`, etc. `W1` through `W7` come with OS-9 Level II, and several are pre-configured. `W8` through `W15` come with *Multi-Vue*. Additional descriptors are available from the Delphi OS-9 Database, or can be made by you. Six or eight descriptors are generally sufficient; 15 is more than most people need.

Level II provides the major graphics capabilities available from the *Shell* level. To accomplish this, you need an interface module for your `OS9Boot` and an application program named `GrfDrv`, which OS-9 automatically loads on boot. Two interface modules, `VDGInt` and `GRFInt`, come with Level II. `VDGInt` interface provides the CoCo 1 and 2 with 192-by-256 pixel graphics and a 32-character screen when using the `TERM` window. To use 40- or 80-character windows and the CoCo 3's high resolution graphics, `GRFInt` must be in your boot. The `Config` program lets you choose which interface to include in your boot, but you can include both. `WindInt` is an enhanced version of `GRFInt` that comes with *Multi-Vue*. It should replace `GRFInt` if you use it.

Remember, `GrfDrv` is a graphics application program required by Level II and automatically loaded at boot. It must *not* be in your `OS9Boot`. Like *Shell*, `GrfDrv` provides functions the system needs to handle the screen, but it is not part of the operating system.

The Summary

Those are the OS-9 system modules, supporting application modules and their basic functions. To end, let us summarize the principle differences between Level I and Level II.

- Many of the Level I modules are unchanged in Level II. The kernel of the operating system was changed to deal with the expanded memory and its GIME memory manager chip.
- `CC3Disk` replaced the `CCDisk` of Level I and reads the disk drive device descriptors. `CC3Disk` lets you fully customize your system to your drive.
- `CC3IO` is the new keyboard and video graphics device driver that deals with the window device descriptors.
- `GrfDrv` is an entirely new program containing a complete set of graphics primitives accessible from the keyboard, batch files or machine language programs. There are few limits: If you want 15 windows, you can have 15 windows. Each will support what is, in effect, a separate terminal with a separate application running or ready to run.
- If you get a hard disk, describe it in a device descriptor and add it, and its driver, to your boot.

There is a lot of effort involved in learning how to set up and use OS-9. Actually, the setup is the hard part. A `StartUp` file can load program modules, initialize windows, start applications and hand the user a machine that is ready to edit text, work on a spreadsheet, and call up a Bulletin Board System at the press of the CLEAR key. The investment comes in learning to configure the boot, write `StartUp` files and do this work. Those not wanting to make this investment in time may not want to dabble in OS-9. But who knows when they will change their minds?

KISSable OS-9

Another Cry for Standards

By Dale L. Puckett
Rainbow Contributing Editor

This month's column will explain why a standard, intuitive user interface is needed in OS-9 application programs and will present a listing of Bill Brady's `FMenu`, a procedure file that modifies OS-9 Level I `CCDisk` drivers and a format utility that recognizes and uses double-sided disk drives. I'll pass along a small correction to last month's *Gfx3* listing and give you a few lines of code that put the new functions to good use.

Designed With the User in Mind

Why do we keep coming back to standards? Most of us buy a CoCo because we have a job for it to do. However, after we bring it home, we discover that it can do *many* jobs. Unfortunately, every time we buy a new software package, we have to learn how to run the CoCo again. This is neither fair nor productive.

For OS-9 to survive in the CoCo market, the number of application programs must rival the number available for Disk BASIC-based Color Computers. Moreover, these new applications must be easier to use than the present crop of Disk BASIC programs, and they all must work the same way.

Tandy recognized the problem several years ago and had Microware develop *Multi-Vue*. Now we must force the software developers (who depend on us to buy their products) to use *Multi-Vue* and create a standard way to do everything that a program must do. We must also insist that the forum SysOps (whose royalty checks depend on the time we use their databases) show others how to use *Multi-Vue* so that our hackers can standardize and enhance the public domain software they make available to us.

We can't insist that newcomers to OS-9 learn to use its internal power. Everyone would be better off if this work were done inside all OS-9 application programs. Indeed, the millions of CoCo owners now stuck with Disk BASIC applications might join us if they could use OS-9 to do their work without learning a new routine for every application.

Wouldn't we rather sell our application software to a base of several million users than to three or four thousand hackers? Don't we need the money?

Take this indictment seriously, but don't absorb too much guilt. After all, the MS-DOS world suffers from the same problem. When you buy a new MS-DOS application program for your business, you still need to send your employees to school for two or three days — and pay the expert $695 per employee for the honor.

However, MS-DOS *machines* are generally owned by large companies that can afford to pay for this training. CoCo owners, on the other hand, can barely afford the price of new software. (They certainly can't afford the time to learn excessively complex operating system details that have nothing to do with the work at hand.) We must hide these complexities from these CoCo owners if we want them to use our products and buy OS-9 application software.

During a recent conversation with a Tandy official, I asked if there was anything new and exciting on the horizon. "New and exciting?" he asked. "We've made the tools available. Now, we're anxiously waiting to see what people do with them." How can we ignore this challenge?

Model for Future OS-9 Applications

Bill Brady addressed the OS-9 standards problem best when he said, "After you learn your 50th piece of software, you lose interest." That may be the reason you only need to double click on a *Multi-Vue* icon to run *WizPro*. It's quite relaxing to lean back and watch

---

Dale L. Puckett, a freelance writer and programmer, serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. His username on Delphi is DALEP: on packet-radio, K0HYD @ N4QQ; on GEnie, D.PUCKETT2; and on CIS, 71446,736.

WizPro connect you to your favorite bulletin board or forum. *WizPro* is an important product with an impressive list of features. The program's most important feature, however, is the standard it sets for future OS-9 application software — especially in the user-interface arena.

Brady has always encouraged fellow developers to release software that's intuitive and friendly. The CoCoBin standard he designed and placed in the public domain is a perfect example. Yet, many of the people who should promote this move toward an intuitive and detail-free user interface, discourage and prevent its growth.

I write this after downloading my first CoCoBin XModem file from GEnie recently. Brady, the OS-9 SysOp on GEnie, had E-Mailed me an updated pre-alpha version of *WizPro*. After starting the XModem download, I instructed *WizPro* to receive it. A few seconds later, I was amazed when my screen displayed a window that looked like a MacBinary file from one of the many Macintosh bulletin boards.

As if by magic, *WizPro* knew the name of the file it was receiving and the number of blocks in the file. As the download proceeded, *WizPro* kept me informed of the download's progress. Later it saved the program in a file and gave it the name that file had on Brady's computer. CoCoBin also automatically took care of the file attributes and other details I once handled manually. All I had to do was run the new program.

Automatic file transfer is only the beginning. Now that Brady has shipped the alpha test version of *WizPro*, he's installing the full CoCoBin II standard. Now when you download a *Multi-Vue*-based program with *WizPro*, you will receive the program, the *Multi-Vue* `AIF` file and the icon file for the program — all automatically. When the download is complete, each file will be stored individually. You only need to move the program file to your `CMDS` directory, the icon file to your `CMDS/ICONS` directory and the `AIF` file to any working directory. To run your new program, just double click on the icon.

Once you use *WizPro* to download a file uploaded in CoCoBin format, you'll never want to return to straight XModem. Knowing that we published the CoCoBin standard more than a year ago and the CoCoBin II standard more recently, I asked Bill why CompuServe and Delphi have no files available in this format.

Brady said that the SysOps have been discouraging the use of the CoCoBin standard and seem to prefer that everyone download on XModem. "Unfortunately, after you download a straight XModem file you aren't finished," Bill explained. "Before you can run the program you just downloaded, you must load it into memory and save it to a new file or run the OS-9 verify utility against it. Then you must run the OS-9 `Attr` utility to set the execute bits on the new file, or you still won't be able to run your new program. Who needs it?" he ended.

> ***"For OS-9 to survive in the CoCo market, the number of application programs must rival the number available for Disk BASIC-based Color Computers."***

The Macintosh SIGs on the major national data services were leaders in the creation of the MacBinary standard. The SysOps recognized that it was unnecessarily complicated for the end user to download a file containing a Macintosh application program. They needed a better way. If they didn't find it, their subscribers would stop downloading files. They would lose online time, and worse, their users wouldn't have access to the many new tools that were being developed and placed in the public domain. Our own SysOps should follow this wise decision.

In addition to the CoCoBin standard, Bill Brady has donated other products to the public domain. His `WizXmod` — a BASIC09 procedure used to add XModem transfer capability to a program — has been available in RAINBOW's Delphi OS-9 Online and other national data services for nearly a year.

FMenu

This month we feature `FMenu` — a new creation that Brady has put in the public domain. Use `FMenu` in *WizPro* when you send a file to the host computer. Adding `FMenu` as a subroutine or procedure to your BASIC09 application program allows you to select a file from any OS-9 directory. The code for `FMenu` appears in Listing 1.

`FMenu` works like — though better than — the standard file dialog Apple gives Macintosh users. The standard file dialog box is one of the major reasons every Macintosh application program opens, closes and saves files in a similar manner. If we want OS-9 to survive in today's market, we must create a consistent and intuitive user interface. We can begin this process by including `FMenu` in our OS-9 programs.

Use `FMenu` to move up and down a list of files in any directory by striking the up and down arrow keys. When the file you want appears in the window at the bottom of your screen, press ENTER to select it. Brady uses the arrow keys instead of a mouse because the computer cannot display the mouse's position on a text-only screen, and *WizPro* is designed to work in a text window (for increased display speed) or in a graphics window. I suggested that Bill add a `GMenu` subroutine that would allow mouse selection of files when *WizPro* is run in a graphics window. (I think he agreed.) Perhaps we will soon have `GMenu` in the public domain as well.

`FMenu` offers a quick-find feature. Thus, if you *think* you know a filename but you don't know its spelling, type the first few character of the filename. `FMenu` will move to the first file with a similar name. (You might even find it the first try.) When you select a directory, press ENTER to move into it. You can skip the directory names and move to the filenames by pressing the space bar. You can return to the beginning of the directory you are listing by pressing ALT-up arrow. Pressing ALT-down arrow takes you to the bottom of the directory listing.

***WizPro* — A Closer Look**

When I asked him to define *WizPro*, Brady said, "It's a telecommunications program that does terminal emulation, but those definitions only scratch the surface. *WizPro* is entirely user redefinable. You can run in a text window or a graphics screen. *WizPro* is also user extendible. You can replace any procedure and add new protocols, autopilots and procedure creation programs. You can even add another terminal program as an extension."

Why would you want to modify your terminal program? Hosts and data services often change their protocol. With *WizPro*, you won't have to rewrite an entire *Comms* program to adopt to a new host — you only need to change the extension. Brady feels *WizPro*'s extendibility should remove much of the delay that follows the changes made by host systems.

Brady also explains why you might add another terminal program as an extension of *WizPro*: "If you really like a particular public domain terminal program, you can run it as an extension of *WizPro*. When you do this, you pick up a few fringe benefits, too. *WizPro* takes care care of all the autologging, record keeping, screen initialization, colors, fonts, etc. — all the dirty work — before it gives control to the other program."

WizPro makes it easy for you to run extension programs, too. When you call these from the menu, *WizPro* passes an initialization string that contains all of the parameters you once had to remember and type at the OS-9 prompt.

What makes *WizPro* different from other terminal programs available on OS-9? According to Brady: "The others are designed to be used in a limited set of circumstances with a specific host or a specific computer and a single baud rate. *WizPro* works with any host at any rate."

Although *WizPro* has grown from the discoveries made during the development and servicing of *Wiz*, *WizPro* does not replace *Wiz*. Rather, the program is designed to combat obsolescence.

WizPro includes mouse pause (or is it mouse paws?) that brings the host to a halt when you click the mouse. Now you'll never watch a message scroll off the screen before you can read it.

`Clipper` is another new feature Brady has added to the program. By pressing ALT-up arrow, you can browse through an 8K buffer that contains the most recently received text. With `Clipper`, you can receive new text online while you view the buffer. You can mark a series of lines and send a snapshot of them to a file, your printer or modem. You can even load the buffer from a file stored on your computer and send a snapshot to the modem or printer.

Brady has improved his conference mode. Now you can use all the control keys except CTRL-X while in the conference mode. Brady can add this function because *WizPro* knows what is happening when it calls an extension. So if you enter `Clipper` while in the conference mode and try to send some text or a file to the host, *WizPro* will switch into the half-duplex time delay mode and send the information. This is the only mode most services will let you use in conference mode. *WizPro* knows that and acts accordingly.

Writing a Program Longer Than 64K

WizPro is so functional because it uses more than 64K of memory (128K of memory in your CoCo 3). Brady shared a few of his secrets with me:

"I can use more than 64K of memory because I overlay procedures and move them in and out of the 64K process space *WizPro* uses," Brady said. "*WizPro* always leaves two 8K blocks of memory free in its 64K process space. All the real-time spacecraft telemetry and command software used by NASA is written in a similar manner."

Through careful design and construction of the program, Brady makes sure that there are always two 8K blocks available. He uses three blocks for data storage, one block as an 8K buffer and two others to hold an additional 4K of *WizPro*'s variables. Out of the eight 8K blocks in a 64K workspace, six blocks have been used. There are two blocks left.

Brady keeps those two 8K blocks free and uses them to run the *WizPro* extension procedures. He switches them into the 64K process space with the BASIC09 `RUN` command. After they have done their job, he switches them out of *WizPro*'s 64K space by using the `KILL` command. Because of BASIC09 and OS-9's excellent design, these extension programs can be located either in the remainder of your CoCo 3's 512K of memory or in a file on one of your disks.

If you want to use Brady's trick to build your own giant BASIC09 programs, you'll need to be aware of one more detail. Brady loads the name of the command he wants to run in a string variable and then runs the string. An example helps clarify this procedure.

First, Brady dimensions a 32-byte string variable named `Proc`. Before *WizPro* calls the XModem procedure, it initializes `Proc` in this manner: `proc:= "XModem"`. The program then runs `Proc` and passes any necessary variables. The command line should read something like this:

```
run proc (paths,colors,flags
 . . . fonts, port)
```

The ellipsis in the program line stands for a number of variable names not typed. In some cases, Brady passes 23 variables to a *WizPro* extension procedure. When he passes these parameters, he is giving the extension procedure access to everything *WizPro* knows.

Introducing the FOCUS™ software system for OS-9™ Level II—serious business for your CoCo3!

FOCUS Applications Hub

A multi-tasking /multi user systems of I/O functions and utilities which features:

- Two level menu system with company code and access code protection.
- Unique filing, sorting, searching and record locking routines.
- Works with most printers, floppy/hard drives and terminals.
- Similar keys and screen formats for all FOCUS-MATE programs.
- Routines for file maintenance, data backup and setup.
- Context-sensitive help screens.

FOCUS-MATE Correspondence Module

An integrated Text Editor, Text Formatter and Mailing List Database:

- Import text or database files for mail merge facilities.
- Control all printer functions, change formats anywhere in text, save formats.
- Preview final text on screen.
- Print with left, right, full or centered justification, tabs, auto headers/footers, page numbering and dictionary lookup.
- Multiple text column capability.

FOCUS-MATE General Ledger Module

A sophisticated General Ledger package for small business.

- All features integrate with other FOCUS-MATE modules.
- Number of accounts and transactions limited only by disk space.
- Auto balance checking, flexible period and year-end procedures, profit/cost center consolidated ledger and batching capabilities.
- Reports: Balance Sheet, Trial Balance, P&L Statement, Transaction Journal, Transaction Aging.

OS-9 Programmers:FOCUS is a great tool-box for system developers!

with purchase of OS-9 Level II and FOCUS, boot file is free, multi-task on 128K! OS-9 Level II $64.95

	Reg.	*Now*
FOCUS	$65.95	$55.95
Correspondence Module	49.95	39.95
General Ledger Module	49.95	39.95
FOCUS Technical Manual	19.95	15.95

Min. Sys. Req.: CoCo3, OS-9 Level II, 360K disk drive, 80 col. display

Easy Street™
Data Systems

4500 19th St. #530
Boulder, CO 80302
(303) 440-4767

Upgrading your CoCo System? Ask us about Peripherals!

Special: Bare 1/2ht. Floppy Drives, 360K $89.95, 720K (31/2') $119.95.

Add $3.00 for shipping/handling
TERMS: COD, Money Order, Cashiers checks, Allow 2 weeks for personal check to clear. Sorry no MC/VISA
Hours: 10:00 to 6:00 MST, Tues.-Sat.

OS-9 is a trademark of Microware and Motorola Inc.

To use this BASIC09 feature, Brady had to carefully organize his program. You will need to do the same. You must also kill each procedure after it runs, or you will run out of space. Most of the time — all the time if you load your packed modules into memory before you run your program — your program won't slow down. When you run the procedures, OS-9 just switches them into the program's workspace. When you kill them, they are switched out. The program does this by toggling a few bytes on your CoCo 3's GIME/memory-management chip.

Because *WizPro* is interrupt-driven, it is fast and behaves well in OS-9's multitasking environment. *WizPro* doesn't take over your computer. *WizPro* XModem can download a long file in one window while you play flight simulator in another window. In addition, *WizPro*'s front end driver `WizAcia` (also released to the public domain) is signal driven. Therefore, program extensions can be called by the host if a certain byte or byte sequence is received, and all of this happens automatically, transparent to the user at the host's command.

Another look at *Gfx3*

If you're a seasoned BASIC programmer, I'll bet you've already caught the mistake in the two nested `IF-THEN-ELSE` decision trees in *Gfx3*, I should have assigned the variable `Act` to a value of 1, 2, 3, etc., instead of 100, 200, 300, etc. You must make this change to get *Gfx3* to perform properly.

When you get ready to create your own *Gfx3*, make sure that you type the names of the actions exactly the way you defined them in *Gfx3* in the calling program. For example, if your *Gfx3* decision tree is looking for an action named `ss.wnset`, then you must type `ss.wnset` exactly that way in the `run gfx3 (‘‘ss.wnset’’)` line in your calling program. *Gfx3* is extremely case-sensitive. The calling program *must* spell the action verb right.

After writing *Gfx3*, I discovered that the module is 2,089 bytes when packed. The original BASIC09 code was 3,806 bytes long and uses 76 bytes to store data. Since this data memory comes out of `RunB`'s 8K memory pool, this will not take any additional 8K memory blocks.

Listings Show *Gfx3* Benefits

To see the benefit of having a subroutine package like *Gfx3* available for your own BASIC09 programs, compare the two different modifications of the *MVShell* code (listings 2 and 3). The first listing comes from a program I named *MVShell2*. It exercises the menu bar we created in June and July with OS-9 System Calls. The other listing comes from *Gfx3Test* and exercises the menu bar in the same manner as does the *MVShell2*. Compare the two listings. You'll want to get right to work on your own *Gfx3*.

> ***"Because* WizPro *is interrupt-driven, it is fast and behaves well in OS-9's multitasking environment.* WizPro *doesn't take over your computer.* WizPro *XModem can download a long file in one window while you play flight simulator in another window."***

We're starting both listings cold with `RUN Gfx2(StdOut,″CurOff″)` from the July column's listing. This will let you add both versions of the code to different copies of *MVShell*. When you run it, you will see the menus pop down and receive a report telling you which menu number and item was selected when you clicked the mouse. Unfortunately, I didn't get a chance to write the code that runs when you make a menu selection. It's designed, however, and should be in a later column.

My *Gfx2* file is 2,497 bytes long — 2,250 for the original *Gfx2*, 94 bytes for `InKey`, 99 bytes for `SysCall` and 54 bytes for `Cls`. If I merge my present *Gfx2* and the *Gfx3* files, I will use 4,586 bytes out of an 8K block. That leaves 3,605 bytes in the 8K block of memory used by OS-9 when it loads *Gfx2* and *Gfx3* from the same file. There are an additional 3,605 bytes to use as we like.

We could do several things with this memory. We could, in fact, use it to make the Tandy `Menu` functions available on all our BASIC09 programs. Yes, I think a 3,600 byte subroutine module is in order. We'll shoot for that listing in the November column.

About Those Missing Lines

The laser-writer gremlins zapped John Lind's listing, `Skipmuf.p` in the June issue. Lines 71 through 78 are missing. Lines 71 through 76 contained definitions, so you *definitely* need them. Here are the missing lines from `Skipmuf.p`:

```
70 mo :ARRAY [1..12] of real;
71 results :ARRAY [1..24] of
real;
72 moname, printpath :ARRAY
[1..12] of char;
73 call :ARRAY [1..12] of char;
74 ocntnt :ARRAY [1..12] of
char;
75 name, ocity, ocntry :ARRAY
[1..12] of char;
76 moarray :ARRAY [1..12] of
monthstr;
77 $PAGE
78 $SUBTITLE Procedure dwset
79 * 80 * DWset - procedure to
create a device in a window of
81 * type 'sty.'
82 *
```

John is presently working on a satellite orbit computation program. He's writing it in BASIC09 first and promises to share that version with you here. Thanks, John.

Double-Sided Disk Access

If OS-9 Level I users don't love Steve Goldberg, they will after they look at this month's listings. Goldberg has created an OS-9 procedure file that will patch your `CCDisk` driver and `Format` command to use double-sided disk drives with OS-9 Level I, Version 2.00. He asked me to pass it along.

`Diskfix` adds the new code to the end of the existing `CCDisk` module and leaves you with your new `CCDisk` module in a file on Drive `/d0`. After you run `Diskfix`, run `OS9Gen` to produce a new boot file. Once `OS9Gen` has created your new `OS9Boot` file, you'll be off and running on double-sided disks.

`Diskfix` is compatible with all previous patches to change the step rate of the drives. In fact, the other patches can be done either before or after you run `Diskfix`. However, you must remember to change `IT.SID` at an offset of $19 bytes in your device descriptors `/d0` and `/d1` from one to two, so that OS-9 will know that you have installed double-sided drives.

The day I was going to send a copy of `Diskfix` to RAINBOW, I got another letter from Goldberg: "Hold the presses! Pull the front page! Here's the ultimate patch for `CCDisk`," he wrote. Goldberg's new version reads the track count, number of sides and the head step rate from the device descriptor. Now you can have several drives with different step rates, and numbers of tracks and sides on the same Level I, Version 2.0 system.

Set the step rate to your disk drives by patching your device descriptor modules at an offset of $14 hex from the beginning of the module. You can do this with `debug` or `modpatch`. An easier way, however, is to use a `Dmode` utility.

You will not be able to boot from a double-sided disk since the `Boot` module is hard-coded for one side only. However, you can boot up with a single-sided disk and then switch to a double-sided disk or keep the original drive as your system drive and use a double-sided drive for your data.

Steve's procedure, `FormatFix`, gives you the ability to format single-sided disks on double-sided drives. It uses a trick submitted by Ray Nicklas published in the May '84 issue of RAINBOW [Page 300].

Making Text Windows Fast

Let's review `MakeGW`, a procedure for making graphics windows first published in *The Complete Rainbow Guide to OS-9 Level II: A Beginners Guide to Windows*. I have been merging `mgw` ever since we wrote the book. Recently, I began thinking about being able to change a window to a text window *quickly*. With one small change and a few more OS-9 command lines, the change was complete. Here's the original `MakeGW`:

```
* First, kill the window we're
running in
display 1b 24
* Now, create a new window
* This one is the standard 80 X
24, four color one we use most
of the time
display 1b 20 7 0 0 50 18 1 0 4
* Set the window to the right
font
display 1b 3a c8 01
* And finally, select the win-
dow we just created
display 1b 21
```

Type the display commands above (You can skip the comment lines if you want) into an OS-9 file, using your favorite editor. Then put the output of the procedure file into a file using OS-9's merge abilities.

```
makegw > mgw
```

Any time you need to change any screen to a four-color, 80-by-24 graphics window, type `merge mgw` and press ENTER. Your new screen will appear like magic. After you make `mgw`, copy `MakeGW` to a new file named `MakeTW` (for Make Text Window). Use your editor to make the second display command line read:

```
display 1b 20 2 0 0 50 18 1 0 4
```

After you have edited `MakeTW`, run it and merge its output into a new file named `mtw`. Now when you want to change that slow graphics window into a fast text-only window, type `merge mtw`, and press ENTER.

That's it for October. Join me next month, and we will continue to explore the functions of OS-9 Level II and *Multi-Vue*. ☐

NEW FOR OS-9™: *FORTH09*™

from D. P. JOHNSON

FORTH09 is a FORTH-83 Standard implementation specially taylored for OS-9. Includes the double number extension word set, system extension word set, complete forth 6809 assembler and more. Programs written in forth can instantly be saved as compact executable machine language modules. The FORTH09 system runs on any level I or level II OS-9 (6809) machine with at least 32k of available memory and one disk drive. Saved Forth09 application code is romable, reentrant and fully position independent, requiring as little as 3k for a small program. Where maximum speed is required the user can force small code words to be automatically compiled as in line code rather than subroutines. Supplied with complete printed documentation. **$150.00** (+ $3 S&H) Specify disk format if other than CoCo OS-9 format desired.

Other OS-9 SOFTWARE from **D. P. JOHNSON**

L1 UTILITY PAK - Contains 40 useful utilities that run under both level I and II OS-9. Included are a complete set of "wild card" file handling utilities, a disassembler, a disk sector editor, and the MacGen command language compiler. MacGen will allow you to generate many useful command macros in minutes, much more useful than procedure files. Macro source is included for a macro to implement an archival backup type function. **$49.95**

L2 UTILITY PAK - Contains a Level II "printerr" function that also **shows the pathname being searched for** when "not found" or permission type errors occur. Also contains level II software ram disk driver. Ten other utilities included, some useful for level I also . **$39.95**

L1+L2 COMBINATION PAK both of above together for **$75.00**

SDISK - Standard disk driver module replacement allows full use of 40 or 80 track double sided drives with OS-9 Level I. Full compatibility with CoCo 35 track format and access all other OS-9 non-CoCo formats. Easy installation. **$29.95**

SDISK+BOOTFIX - As above plus boot directly from a double sided diskette. **$35.95**

SDISK3 - Level II version of SDISK driver. Same features as level I (except bootfix not required to boot from double sided). **$29.95**

PC-XFER UTILITIES - Programs to format and transfer files to/from MS-DOS™ diskettes on CoCo under OS-9. (Requires either SDISK or SDISK3 to run depending on which level of OS-9 you are using) **$45.00**

MSF - MS-DOS disk format file manager. More complete file transfer capabiltites for level II only. (Requires SDISK3 to operate). Now supports 720K 5-1/4" and 3-1/2" MS-DOS Formats. **$45.00** MSF+SDISK3 together **$65.00**

All diskettes are in CoCo OS-9 format unless otherwise requested; other OS-9 formats can be supplied for $2.00 additional charge. All orders must be prepaid or COD, VISA/MC accepted, add $1.75 S&H for first software item, + .25 for each additional item, $5.00 for CCRD, additional charge for COD.

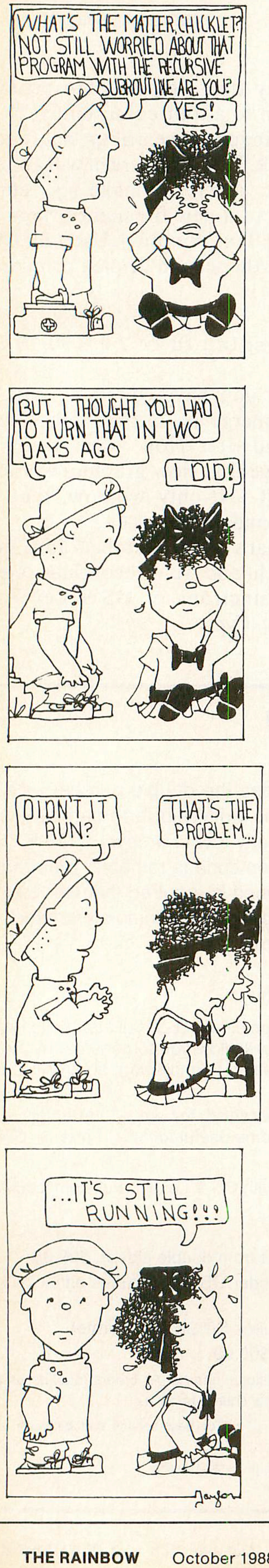
D. P. Johnson, 7655 S.W. Cedarcrest St., Portland, OR 97223 (503) 244-815 * (For best service call between 9-11 AM Pacific Time, Mon.-Fri.)

* NOTE: There will be no phone order or consultation service between Oct. 7 and Oct. 31 1988 due to vacations,.. mail orders will still be processed weekly.

OS-9 is a trademark of Microware and Motorola Inc., MS-DOS is a trademark of Microsoft, Inc., FORTH09 is a trademark of D. P. Johnson

Dr. Nibble

By Kelly Taylor


WHAT'S THE MATTER, CHICKLET? NOT STILL WORRIED ABOUT THAT PROGRAM WITH THE RECURSIVE SUBROUTINE ARE YOU?
YES!
BUT I THOUGHT YOU HAD TO TURN THAT IN TWO DAYS AGO
I DID!
DIDN'T IT RUN?
THAT'S THE PROBLEM...
...IT'S STILL RUNNING!!!
Taylor

Listing 1: FMenu

```
PROCEDURE FMenu
 0000     (* A demonstration program that shows you how to build a standard
 0041     (* file handling menu into your Basic09 programs.  FMenu was
 007E     (* written by WizPro author Bill Brady who is presently adding
 00BD     (* mouse support.  Brady has released this code into
 00F1     (* the public domain.  He plans on releasing the final version with
 0134     (* full mouse support -- even in a text screen -- also.  Stay tuned!
 0178
 0179     (* First we must define a few data types that are built into WizPro
 01BC     (* then we'll be on with the demo.  You may find many of these
 01FB     (* equates useful in your own Basic09 programs.  They are similar
 023C     (* to those used in the KISSDraw and MVShell code we published
 027A     (* earlier this year.
 028F
 0290     TYPE wpaths=sp,spa,wpa,dpa,ppa:BYTE; siop,piop:STRING[3]; ho

           ,rxfile,host:STRING; spd(32),oldesc(32),newdesc(32):BYTE
 02E5     DIM paths:wpaths
 02EE
 02EF     TYPE windows=flatl,flat,stat,bottom:STRING[9]; vt80,vt40,gwin

           ,main:STRING[12]; menu:STRING[63]; mes:STRING[42]; tmenu

           ,tmes:STRING[15]; ask,prmpt:STRING[9]
 0356     DIM win:windows
 035F
 0360     TYPE commands=dwend,dwsel,owend,defcolor,ulon,uloff,pal,hdds

           :STRING[2]; DLpos,PRpos,ATpos,br,bufnum,group,revoff,

           rev,prop,propoff,bold,boldoff:STRING[3]; four,palette

           :STRING[4]
 03D2     DIM cmds:commands
 03DB
 03DC     TYPE flg=acia6551,TEXT,gmode,roll,bufroll,chdfl,vt52,vtansi

           ,OPLOPEN,spopen,WPAOPEN,SPAOPEN,PSP,BLDF,conf,pfl,dfl

           ,exit,ex,dup,mu:BOOLEAN
 0437     DIM flags:flg
 0440
 0441     TYPE calls=ststat,gtstat,cursr,screen,reed,wrt,wrtln,creat,

           sleep,pid,setpri,pag,bau,typ,pau,alf,ech,eor,endof,qut

           ,intrpt,opt,bsp,bso,bse:BYTE
 04AC     DIM caw:calls
 04B5
 04B6     TYPE con=esc,cr,lf,bs,bl,home,cls,ptabl,lbrk,BK:STRING[1]; Mkey

           :BYTE
 04F0     DIM cntrl:con
 04F9
 04FA     TYPE strings=ddir,crtc,aktc,pnr:STRING; ontime:STRING[8]; hh

           ,mm:INTEGER
 0526     DIM strg:strings
 052F
 0530     TYPE PRNeq=forePRN,backPRN,menuforePRN,menubackPRN,otherforePRN
           ,otherbackPRN,curPRN,menucurPRN,othercurPRN:STRING[1]

 0560     DIM PRNs:PRNeq
 0569
 056A     TYPE regs=ccode,a,b,dp:BYTE; x,y,u:INTEGER
 058F     DIM s:regs
 0598
 0599     DIM menwin,point2,point,point1,box,box1,box2:STRING[6]
 05BD     DIM windTYPE,borderPRN:STRING[1]
 05CD     DIM dwset,owset,cwarea:STRING[2]
 05E1     DIM comm:STRING
 05E8
 05E9
 05EA     (* We must also initialize a few of the fields that are used in the
 062D     (* demo program.  The data types above are just a few of the parameters
 0674     (* passed to WizPro extension programs.
 069B     cntrl.cls=CHR$($0C) \cntrl.home=CHR$(1)
 06B4     cntrl.cr=CHR$(13) \cntrl.lf=CHR$(10)
 06CC     cntrl.bs=CHR$(8) \cntrl.bl=CHR$(7)
 06E4     cntrl.lbrk=CHR$(133)
 06F0     cntrl.esc=CHR$(27)
 06FC     cntrl.Mkey=3
 0707     cmds.hdds="02"
 0714     cmds.four=cntrl.cr+cntrl.cr+cntrl.cr+cntrl.cr
 0738     strg.aktc=" Any Key to Continue"
 0757     strg.crtc=" <ENTER> to Continue"
 0776     strg.pnr="  Path not Ready "
 0793     cntrl.ptabl=CHR$(127)
 079F
 07A0     (* System Equates
 07B1     caw.screen=$8C \ \caw.reed=$89 \caw.cursr=$25
 07D6     caw.ststat=$8E \caw.sleep=$0A \caw.gtstat=$8D
 07FA     caw.wrt=$8A \caw.wrtln=$8C \
 0813     caw.creat=$83
 081F     caw.pau=8
 082A     caw.eor=12 \caw.endof=13 \caw.qut=18 \caw.intrpt=17
 0856     caw.opt=0 \caw.bsp=10 \caw.bso=3 \caw.bse=19
 0882     caw.alf=6
 088D     caw.bau=22 \caw.typ=21
 08A3     caw.pag=9 \caw.ech=5
```

```
08B9      caw.pid=$0C \caw.setpri=$0D
08D1      cmds.defcolor=CHR$(27)+CHR$($30)
08E2
08E3      (* Screen Equates
08F4      cntrl.BK=STR$(15)
0900      cmds.hdds="2"
090C      flags.TEXT=TRUE
0916      cmds.owend=cntrl.esc+CHR$($23) \cmds.dwend=cntrl.esc+CHR$(24

           ) \cmds.pal=cntrl.esc+CHR$($31)
0951      cmds.defcolor=cntrl.esc+CHR$($30) \cmds.dwsel=cntrl.esc+CHR$

           ($21)
0979      cmds.DLpos=CHR$(2)+CHR$(32+16)+"!"
0990      cmds.PRpos=CHR$(2)+" "+"!"
09A4      cmds.ATpos=CHR$(2)+CHR$(32+48)+"!"
09BB      cmds.rev=CHR$($1F)+CHR$($20)+CHR$(0) \cmds.revoff=CHR$($1F)
           +CHR$($21)+CHR$(0)
09E7      IF flags.TEXT THEN
09F3        cmds.bold=CHR$(0)+CHR$(0)+CHR$(0)
0A07        cmds.boldoff=cmds.bold
0A16        cmds.prop=cmds.bold
0A25        cmds.propoff=cmds.bold
0A34      ELSE
0A38        cmds.bold=cntrl.esc+CHR$($3D)+CHR$(1)
0A50        cmds.boldoff=cntrl.esc+CHR$($3D)+CHR$(0) \cmds.prop=cntrl.esc

             +CHR$($3F)+CHR$(1)
0A80        cmds.propoff=cntrl.esc+CHR$($3F)+CHR$(0)
0A98      ENDIF
0A9A      cmds.ulon=CHR$($1F)+CHR$($22) \cmds.uloff=CHR$($1F)+CHR$($23

           )
0ABE
0ABF      (* Window Equates
0AD0      PRNs.forePRN=CHR$(0) \PRNs.backPRN=CHR$(1) \borderPRN=PRNs.backPRN
0AF3      IF flags.TEXT THEN
0AFF        windTYPE=CHR$(2)
0B07        PRNs.curPRN=CHR$(0) \PRNs.forePRN=CHR$(8)
0B1F        PRNs.backPRN=CHR$(1)
0B2B        PRNs.menucurPRN=CHR$(2) \PRNs.menuforePRN=CHR$(10)
0B43        PRNs.menubackPRN=CHR$(3)
0B4F        PRNs.othercurPRN=CHR$(4) \PRNs.otherforePRN=CHR$(12)
0B67        PRNs.otherbackPRN=CHR$(5)
0B73      ELSE
0B77        windTYPE=CHR$(5)
0B7F        PRNs.menuforePRN=PRNs.forePRN \PRNs.menubackPRN=PRNs.backPRN
0B9D        PRNs.otherforePRN=PRNs.backPRN \PRNs.otherbackPRN=PRNs.forePRN
0BBB      ENDIF
0BBD
0BBE      cmds.owend=cntrl.esc+CHR$($23) \cmds.dwend=cntrl.esc+CHR$($24

           ) \cmds.dwsel=cntrl.esc+CHR$($21)
0BFA      dwset=cntrl.esc+CHR$($20) \owset=cntrl.esc+CHR$($22) \cwarea

           =cntrl.esc+CHR$($25)
0C2A
0C2B      win.bottom=dwset+CHR$(0)+CHR$(0)+CHR$(23)+CHR$(80)+CHR$(1)+

           PRNs.otherbackPRN+PRNs.othercurPRN
0C59      win.stat=dwset+CHR$(0)+CHR$(0)+CHR$(0)+CHR$(80)+CHR$(2)+PRNs.othercurPRN

           +PRNs.otherbackPRN
0C87      win.main=cmds.dwend+dwset+windTYPE+CHR$(0)+CHR$(2)+CHR$(80)

           +CHR$(21)+PRNs.curPRN+PRNs.backPRN+borderPRN
0CC0      win.ask=owset+CHR$(1)+CHR$(18)+CHR$(18)+CHR$(44)+CHR$(3)+PRNs.menucurPRN

           +PRNs.menubackPRN
0CEE      win.prmpt=owset+CHR$(0)+CHR$(24)+CHR$(19)+CHR$(33)+CHR$(1)+

           PRNs.curPRN+PRNs.backPRN
0D1C
0D1D      (* Note here that everyone who purchases WizPro will receive a
0D5B      (* copy of the entire WizEquates file in source form.  WizEquates
0D9C      (* is so well done that it will make writing your own WizPro extensions
0DE3      (* much easier.  All of the boring work of defining data
0E1B      (* types and other variables has been done for you.  WizPro can be
0E5D      (* told to pass the entire equates packet to your own WizPro extension
0EA3      (* when you run them.  This means you can use all of the WizPro
0EE3      (* definitions instead of starting from scratch and building your own.
0F29
0F2A      (* The next code sequence puts the windows on your Color Computer
0F6B      (* screen for FMenu.
0F7F
0F80      PRINT win.main;
0F89      PRINT cmds.dwsel;
0F92      OPEN #paths.wpa,"/w":UPDATE \flags.WPAOPEN=TRUE \ PUT #paths.wpa

           ,win.bottom
0FBE      OPEN #paths.spa,"/w":UPDATE \flags.SPAOPEN=TRUE \ PUT #paths.spa

           ,win.stat
0FEA      PRINT #paths.wpa," Wiz ";  \ PRINT #paths.spa,cmds.bold;  \

           PRINT #paths.spa,"  Wiz ";
1020
1021
1022      (* Fmenu actually begins here !!!
1043
1044 1000 TYPE record=d(29):BYTE; lsn:BYTE
105D      DIM fmentry:record
1066
```

PERRY COMPUTERS
The Ideal Buy
1-800-248-3823

TANDY COMPUTERS

Tandy 1000-HX 256K 5 1/4"D.	535.00
Tandy 1000-SL 384K 5 1/4"D.	675.00
Tandy 1000-TL 640K 3 1/2"D.	955.00
Tandy 3000-NL 512K 3 1/2"D.	1275.00
Tandy 4000-LX 2 Meg 3 1/2"D.	2999.00
Tandy 4000 1 Meg 3 1/2" D.	1890.00
Tandy 5000MC 2 Meg 1 Drive	3825.00
Tandy 5000MC 2 Meg 40 Meg	4955.00
Tandy 5000MC 2 Meg 84 Meg	5395.00
Tandy 1400LT 768K 2 Drives	1285.00
Tandy 102 24K	430.00
Tandy Color 3 128K	155.00

MONITORS & BOARDS

VM-4 Monochrome Green	95.00
VM-5 Monochrome Green	115.00
CM-5 Color RGB	220.00
CM-11 Color RGB	335.00
EGM-1 Color RGB (EGA)	510.00
VGM-100 Monochrome Analog	169.00
VGM-200 Color Analog	425.00
VGM-300 Color Analog	535.00
Tandy Dual Display Card	145.00
Tandy EGA Card	185.00
Paradise Basic EGA Card	160.00
Zucker Mono Graphics Card	75.00

DRIVES

Color Computer Drive 0	225.00
5 1/4" External Drive 1000EX	180.00
3 1/2" External Drive 1000EX	200.00
Tandy 20 Meg Hardcard	450.00
5 1/4" External for Tandy 1400	215.00
Zucker 30 Meg Hardcard	435.00
Seagate 20 Meg Hard Drive	265.00
Tandy 1000/SX/TX Controller	80.00

ZUCKER BOARDS

Zucker Serial Board	45.00
Zucker 0K Memory Board 1000	47.00
Zucker MFB 0K for 1000	106.00
Zucker 1200 Baud Modem Card	75.00

PRINTERS

DMP-106 Dot-Matrix	165.00
DMP-132 Dot-Matrix	285.00
DWP-230 Daisy Wheel	345.00
Epson LX-800 Dot-Matrix	205.00
Epson FX-850 Dot-Matrix	375.00
Epson FX-1050 Dot-Matrix	540.00
Epson LQ-500 Dot-Matrix	375.00
Epson LQ-850 Dot-Matrix	579.00

Please write for complete price list.
We carry more items than listed here.

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. C.O.D. accepted add 2% (minimum charge $10.00). M.C., Visa add 2%. All non defective items require return merchandise authorization. Call for RMA Number before returning. Delivery is subject to product availability. Add 1½% for shipping and handling, $5.00 minimum charge.

TM - Registered Trademark of Tandy, Epson, and IBM

Monday thru Friday 9am - 5pm EST.

PERRY COMPUTERS

124 South Main Street, Perry, MI 48872
CALL 1-517-625-4161 or TOLL-FREE
1-800-248-3823

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

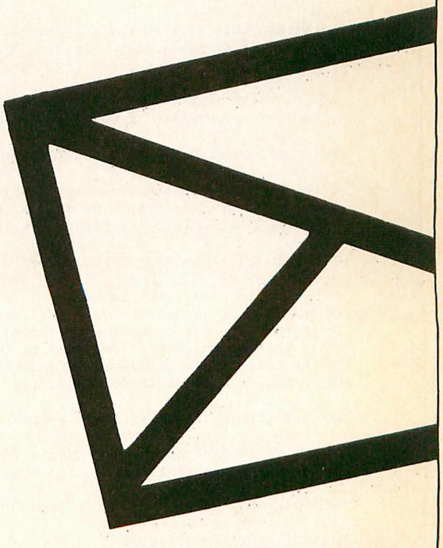
```
1067      DIM ent(88):STRING[19]
1078
1079      DIM fmii,kk,111,xx,yy:INTEGER
1090      DIM aa,cch:BYTE
109B      DIM dirpopen,more:BOOLEAN
10A6      DIM char:STRING[1]
10B2      DIM search:STRING
10B9 1002 fmii=0
10C3      comm=""
10CA 1010 OPEN #aa,".":READ+DIR
10D9      dirpopen=TRUE
10DF      ON ERROR GOTO 1060
10E5      SEEK #aa,0
10EE      PUT #1,cntrl.cls
10FB      FOR kk=1 TO 88 \ent(kk)="." \NEXT kk
1122      more=FALSE
1128      kk=1
112F 1020 REPEAT
1134        SEEK #aa,fmii \ GET #aa,fmentry
1148        IF fmentry.d(1)>0 THEN  \xx=0
1160          ent(kk)=""
116B
116C          (* scrub the entry, files can be made invisible here with a filter
11AE          (* like if you see a "." an dont want files with extension
11E8          (* let fmii go ahead back up kk
1207
1208          REPEAT  \xx=xx+1
1215            ent(kk)=ent(kk)+CHR$(LAND(fmentry.d(xx),127))
1232          UNTIL fmentry.d(xx)>127 OR xx=18
124A
124B          ent(kk)=ent(kk)+""
125D          IF kk=88 THEN more=TRUE \fmii=fmii-32 \ GOTO 1030 \ ENDIF
127F          kk=kk+1
128A        ENDIF
128C        fmii=fmii+32.
129D      UNTIL EOF(#aa)
12A6
12A7 1030 (* print the suckers!
12BF      CLOSE #aa \dirpopen=FALSE
12CB      111=kk \kk=1
12DA      FOR yy=1 TO 111 STEP 8
12F0        PRINT USING "s8<,x2,s8<,x2,s8<,x2,s8<,x2,s8<,x2,s8<,x2,s8<,x2,s8<"

           ,ent(yy),ent(yy+1),ent(yy+2),ent(yy+3),ent(yy+4),ent

           (yy+5),ent(yy+6),ent(yy+7)
1376      NEXT yy
1381      IF more THEN PRINT " ** Overflow, 88 or more files in this directory:  type + for mor
e **"


           ;
13D3      ENDIF
13D5 1040 (* make selection
13E9      PRINT #paths.wpa,cntrl.cls
13F9      PRINT #paths.wpa,TAB(34); ">";
140B      PUT #paths.spa,cntrl.home
141C      PRINT #paths.spa,"DnArrow=next UpArrow=back ALT-Up=Top ALT-Dn=Bottom Space=find next
lower case"

          ;
1476      PUT #1,win.ask
1483      olays=olays+1
148F      PRINT USING "s42^","Select name hit <Enter>"
14B2      PRINT
14B4      PRINT USING "s42^","<filename> or </full/pathname>";
14DF      (* enable keysense
14F1      s.a=0 \s.b=$27 \s.x=1 \RUN s9scall(caw.ststat,s)
1525      PUT #1,win.prmpt
1532      olays=olays+1
153E      PRINT USING "s28^",ent(1);
154E      search=""
1555
1556      REPEAT
1558
1559        (* software key bounce filter
1576 1042   s.a=0 \s.b=$27 \RUN s9scall(caw.gtstat,s)
15A2        IF s.a>4 THEN
15B1          fmentryo=s.a
15BD          s.x=5 \RUN s9scall(caw.sleep,s)
15DA          s.a=0 \s.b=$27 \RUN s9scall(caw.gtstat,s)
1603          IF s.a<>fmentryo THEN 1042
1617
1618          (* Space Bar
1625          IF LAND(s.a,$80)=$80 THEN
1639            REPEAT  \ IF kk<111 THEN kk=kk+1 \ ENDIF  \ UNTIL kk=

             111 OR ASC(ent(kk))>97
166B            GOTO 1044
166F          ENDIF
1671
1672          (* up arrow
167D          IF LAND(s.a,$08)=$08 THEN
1691            IF kk<>1 THEN kk=kk-1 \ ENDIF
16A9          ENDIF
16AB
16AC          (* down arrow
16B9          IF LAND(s.a,$10)=$10 THEN
16CD            IF kk<111 THEN kk=kk+1 \ ENDIF
16E6          ENDIF
16E8
16E9          (* alt-up
16F2              IF LAND(s.a,12)=12 THEN
1704                kk=1
170B              ENDIF
170D
170E              (* alt-down
1719              IF LAND(s.a,$14)=$14 THEN
172D                kk=111
1735              ENDIF
1737
1738              (* print current selection
1752 1044         PUT #1,cntrl.cls \ PRINT USING "s30^",ent(kk);
1773
1774            ENDIF
1776
1777            (* end of keysense processing
1794
1795            (* do a regular key
17A8            RUN gtkey(char) \ IF char>"" THEN
17BE              PUT #paths.wpa,char
17CB              IF char="+" OR char="=" THEN GOSUB 2000 \ GOTO 1010 \ ENDIF


17E9              IF char<>cntrl.cr AND char<>"/" THEN
1801                PUT #1,cntrl.cls
180E                (* user is typing filename
1828                search=search+char \kk=1
183B                REPEAT  \ IF kk<111 THEN kk=kk+1 \ ENDIF
1856                UNTIL kk=111 OR LEFT$(ent(kk),LEN(search))=search
1872                IF kk=111 THEN PRINT #paths.wpa,cntrl.bl; cntrl.cls \

                       PRINT #paths.wpa,TAB(34); ">";  \search="" \ ENDIF


18B0                GOTO 1044
18B4              ENDIF
18B6            ENDIF
18B8
18B9            s.x=4 \RUN s9scall(caw.sleep,s)
18D6
18D7          UNTIL char=cntrl.cr OR char="/"
18EE          PUT #1,cntrl.cls
18FB
18FC          (* user wants to type a pathname
191C          IF char="/" THEN INPUT "/",comm
1931            comm="/"+comm
193D            GOTO 1058
1941          ENDIF
1943          comm=ent(kk)
194E
194F          (* Find out if our selection is a Dir or a file
197E          (* If a Dir make it our new DDIR (current working dir)
19B4 1058 ON ERROR GOTO 1059 \en=0 \ CHD comm
19CA 1059 en=ERR \ IF en=0 THEN IF comm<>"." THEN strg.ddir=comm \ ENDIF

              \ GOSUB 2000 \ GOTO 1000 \ ENDIF
1A04          ON ERROR GOTO 1070
1A0A 1060 en=ERR
1A14          IF en=211 THEN 1030
1A24          IF en>0 AND en<>195 THEN PRINT #paths.wpa,"*err"; en;  \ ENDIF


1A4F          ON ERROR GOTO 1070
1A55
1A56          (* keysense off
1A65          s.a=0 \s.b=$27 \s.x=0 \RUN s9scall(caw.ststat,s)
1A99          IF dirpopen THEN CLOSE #aa \ ENDIF
1AA9
1AAA          GOSUB 2000
1AAE          PUT #1,cntrl.cls
1ABB          PRINT #1,"You have selected a file named, "; comm
1AE7          PRINT #1,"Let's call the Shell and find its attributes!"
1B1C          PRINT
1B1E          SHELL "attr "+comm
1B2B          PRINT
1B2D          PRINT "Type 'CONT' to try for another file!"
1B55          PAUSE
1B57          GOTO 1000
1B5B          END
1B5D
1B5E          (* This is the normal exit of FMenu.
1B82          (* 5000 is the FMenu's normal error exit.
1BAB
1BAC 1070 en=ERR \ ON ERROR GOTO 5000
1BBC          GOSUB 2000
1BC0          IF en>2 THEN
1BCD            PRINT #paths.wpa," Directory Error"; en;
1BEE            GOTO 5000
1BF2          ENDIF
1BF4          RETURN
1BF6
1BF7 2000 (* close windows
1C0A          ON ERROR GOTO 2004
1C10          PUT #1,cmds.owend
1C1D          olays=olays-1
1C29          PUT #1,cmds.owend
1C36          olays=olays-1
1C42 2004 en=ERR \en=0 \ RETURN
1C56
1C57 5000 PRINT "You have exited with error number "; en
1C84          END
```

About Your Subscription

Your copy of THE RAINBOW is sent second class mail. You must notify us of a new address when you move. Notification should reach us no later than the 15th of the month prior to the month in which you change your address. Sorry, we cannot be responsible for sending another copy when you fail to notify us.

Your mailing label also shows an account number and the subscription expiration date. Please indicate this account number when renewing or corresponding with us. It will help us help you better and faster.

For Canadian and other non-U.S. subscribers, there may be a mailing address shown that is different from our editorial office address. Do not send any correspondence to that mailing address. Send it to our editorial offices at Falsoft, Inc., The Falsoft Building, P.O. Box 385, Prospect, KY 40059. This applies to everyone *except* those whose subscriptions are through our distributor in Australia.



Listing 2: Mod1

```
(* Insert this code in MVShell from the August Issue of
(* KISSAble OS-9.  It should follow the line that reads
(* "RUN Gfx2(StdOut,"CurOff")

(* First, we'll make a SysCall with the Set Window function
(* code to prove that it works.

CallCode:=$8E \(* Set Status Code
Regs.a:=StdOut
Regs.b:=$86 \(* SS.WnSet function code
Regs.x:=ADDR(WndScr)
Regs.y:=WT_FWin

RUN SysCall(CallCode,Regs)

(* We must turn on the mouse and set its global parameters
(* Here we tell the system we are using a high resolution
(* mouse plugged into the right joystick port.

Regs.a:=StdIn
Regs.b:=SS_GIP
Regs.x:=$0101 \(* HiRes, Right Joystick
Regs.y:=$FFFF \(* Do not change timing
CallCode:=I_SetStt
RUN SysCall(CallCode,Regs)

(* Now we must tell the mouse how often to update itself
(* and when it should timeout.  We also must tell the
(* graphics cursor to follow the mouse.  We do the latter
(* by setting the 6809 Y-register to "Follow" or "1" before
(* the call.  This parameter is undocumented in early versions
(* of the OS-9 Level II documentation.

Regs.a:=StdIn
Regs.b:=SS_Mouse
Regs.x:=$0301 \(* Update / timeout info
Regs.y:=Follow
CallCode:=I_SetStt
RUN SysCall(CallCode,Regs)

(* Now we can set up the 6809 registers and make the call
(* to set up the intercept.

CallCode:=F_Icpt
Regs.x:=ADDR(IceptCode)
Regs.u:=ADDR(IceptCode)+4
RUN SysCall(CallCode,Regs)

(* We'll turn on the Graphics Cursor so you can
(* watch mouse movement on the screen.  We'll make
(* it an arrow.

RUN Gfx2("gcset",Grp_Ptr,Ptr_Arr)

(* The main loop of our future program will start here

LOOP  \(* Do this forever

PRINT
PRINT "Type <Control E> or <BREAK> to stop !!!"
IceptCode.IntResult:=0 \(* Initialize Signal Report

(* Tell mouse which signal you want
(* it to return when the button is pushed.  Do
(* this with the SS_MsSig set status call

Regs.a:=StdIn
Regs.b:=SS_MsSig
Regs.x:=MouseSig
CallCode:=I_SetStt
RUN SysCall(CallCode,Regs)

(* Now we must tell the process to go to sleep until
(* it receives a signal to wake up.

CallCode:=F_Sleep
Regs.x:=0 \(* Sleep forever -- at least till signal
RUN SysCall(CallCode,Regs)

(* After a signal or interrupt wakes up the system, we
(* should be able to find out if it was the mouse
(* that generated the signal by looking at IceptCode.Result
(* When we arrive here, the process has just awakened
(* and we will test to see if the signal came from the
(* mouse.

EXITIF IceptCode.IntResult=2 THEN
ENDEXIT

IF IceptCode.IntResult=MouseSig THEN
GOSUB 1000 \(* Go Read Mouse
IF msret.stat=WR_Cntrl AND msret.cbsa<>0 THEN
DoMenuItem:=TRUE
ELSE
DoMenuItem:=FALSE
ENDIF
ENDIF
GOSUB 200 \(* Go Check Menu
IF Menu_ID<>0 THEN
RUN DoMenu
ENDIF
IF DoMenuItem=TRUE THEN
PRINT "The Menu ID is: "; Menu_ID
PRINT "The Menu Item No. is "; Menu_Item
ENDIF
ENDLOOP

(* Always turn off graphics cursor before leaving program

RUN Gfx2("gcset",0,0)

END

200 (* Subroutine to check Menu

Regs.a:=StdIn
Regs.b:=SS_MnSel
CallCode:=I_Getstt
RUN SysCall(CallCode,Regs)
Menu_ID:=Regs.a
Menu_Item:=Regs.b
RETURN

1000 (* Subroutine to get mouse packet
Regs.a:=StdIn
Regs.b:=SS_Mouse
Regs.x:=ADDR(msret)
CallCode:=I_Getstt
RUN SysCall(CallCode,Regs)
RETURN
```

Listing 3: Mod2

```
(* Insert this code in the file MVShell from the August
(* issue of KISSable OS-9.  It should replace everything
(* after the line that reads: "RUN Gfx2(StdOut,"CurOff")

(* Now we'll make a SysCall with the Set Window function
(* code to prove that it works.

RUN gfx3(StdOut,"ss.wnset",ADDR(WndScr),WT_FWin)

(* We must turn on the mouse and set its global parameters
(* Here we tell the system we are using a high resolution
(* mouse plugged into the right joystick port.

RUN gfx3(StdIn,"ss.gip",$0101,$FFFF)

(* Now we must tell the mouse how often to update itself
(* and when it should timeout.  We also must tell the
(* graphics cursor to follow the mouse.  We do the latter
(* by setting the 6809 Y-register to "Follow" or "1" before
(* the call.  This parameter is undocumented in early versions
(* of the OS-9 Level II documentation.

RUN gfx3(StdIn,"ss.mous",$0301,Follow)

(* Now we can set up the 6809 registers and make the call
(* to set up the intercept.

CallCode:=F_Icpt
Regs.x:=ADDR(IceptCode)
Regs.u:=ADDR(IceptCode)+4
RUN SysCall(CallCode,Regs)

(* We'll turn on the Graphics Cursor so you can
(* watch mouse movement on the screen.  We'll make
(* it an arrow.

RUN Gfx2("gcset",Grp_Ptr,Ptr_Arr)

(* The main loop of our future program will start here

LOOP  \(* Do this forever

PRINT
PRINT "Type <Control E> or <BREAK> to stop !!!"

IceptCode.IntResult:=0 \(* Initialize Signal Report

(* Tell mouse which signal you want
(* it to return when the button is pushed.  Do
(* this with the SS_MsSig set status call

RUN gfx3(StdIn,"ss.msig",MouseSig)

(* Now we must tell the process to go to sleep until
(* it receives a signal to wake up.

CallCode:=F_Sleep
Regs.x:=0 \(* Sleep forever -- at least till signal
RUN SysCall(CallCode,Regs)
(* After a signal or interrupt wakes up the system, we
(* should be able to find out if it was the mouse
(* that generated the signal by looking at IceptCode.Result
(* When we arrive here, the process has just awakened
(* and we will test to see if the signal came from the
(* mouse.

EXITIF IceptCode.IntResult=2 THEN
```

```
ENDEXIT

IF IceptCode.IntResult=MouseSig THEN
GOSUB 1000 \(* Go Read Mouse
IF msret.stat=WR_Cntrl AND msret.cbsa<>0 THEN
DoMenuItem:=TRUE
ELSE
DoMenuItem:=FALSE
ENDIF
ENDIF

IF DoMenuItem=TRUE THEN
GOSUB 200 \(* Go Check Menu
PRINT "The Menu ID is "; Menu_ID
PRINT "The Menu Item is "; Menu_Item
IF Menu_ID<>0 THEN
RUN DoMenu
ENDIF
ENDIF
ENDLOOP

(* Always turn off graphics cursor before leaving program

RUN Gfx2("gcset",0,0)

END

200 (* Subroutine to check Menu

RUN gfx3(StdIn,"ss.mnsel",Menu_ID,Menu_Item)
RETURN

1000 (* Subroutine to get mouse packet

RUN gfx3(StdIn,"gs.mous",ADDR(msret))
RETURN
```

Listing 4: DiskFix

```
* Patches Level I Ver. 2
* CCDisk to read, write
* and format both single
* and double sided disks
t
tmode .1 -pause
save /d0/ccdisk ccdisk
debug
lccdisk
. .+7
=80
$load /d0/ccdisk
lccdisk
. .+3
=82
lccdisk
. .+1c9
=16
=01
=84
lccdisk
. .+1f8
=5f
=17
=01
=76
lccdisk
. .+2ae
=e6
=c9
=00
=a9
=16
=00
=8c
=12
=23
=02
lccdisk
. .+2dd
=40
=12
=12
=12
=17
=00
=90
. .+3
=5f
=16
=00
=81
lccdisk
. .+341
=a6
=07
=85
=01
=26
=02
=ca
=40
=a6
=09
=81
=15
=16
=ff
=66
=a6
=88
=10
=85
=01
=27
=0e
=64
=e4
=24
=0a
=a6
=c9
=00
=a9
=8a
=40
=a7
=c9
=00
=a9
=35
=02
=81
=15
=16
=fe
=61
=ea
=a8
=22
=16
=ff
=01
=cb
=10
=ea
=a8
=22
=34
=02
=17
=fe
=f7
=35
=02
=39
q
del /d0/ccdisk
save /d0/temp ccdisk
verify u </d0/temp >/d0/ccdisk
del temp
tmode .1 pause
-t
```

Listing 5: FormatFix

```
* Patches the Format utility to
* permit formatting single sided
* disks on double sided drives and
* provides for a choice of number
* of tracks. Use * (asterisk) as an
* option for single sided formatting.
* Use number of tracks in parentheses
* as option to change track count.
t
load format
debug
lformat
. .+1a3
=49
. .+4
=2a
=01
. .+1
=0f
lformat
. .+a85
=a0
=8c
=39
q
del -x format
save /d0/cmds/format format
unlink format
-t
```

Racksellers

The retail stores listed below carry THE RAINBOW on a regular basis and may have other products of interest to Tandy Color Computer users. We suggest you patronize those in your area.

ALABAMA

Birmingham	Jefferson News Co.
Brewton	McDowell Electronics
Florence	Anderson News Co.
Greenville	M & B Electronics
Madison	Madison Books
Montgomery	Trade 'N' Books
Tuscaloosa	Injun John's, Inc.

ALASKA

Fairbanks	Arrow Appliance/Radio Shack
	Electronic World

ARIZONA

Cottonwood	A & W Graphics Co.
Lake Havasu City	Book Nook
Phoenix	TRI-TEK Computers
Tempe	Books, Etc.
	Computer Library
Tucson	Anderson News Co.

ARKANSAS

Fayetteville	Vaughn Electronics/Radio Shack
Ft. Smith	Hot Off the Press Newsstand
Little Rock	Anderson News Co.

CALIFORNIA

Berkeley	Lyon Enterprises
Citrus Heights	Software Plus
Grass Valley	Advance Radio, Inc.
Hollywood	Levity Distributors
	Stef-Jen, Inc.
La Jolla	Butler & Mayes Booksellers
Los Angeles	Circus of Books (2 Locations)
Marysville	Bookland
Napa	Bookends Bookstore
Oakland	DeLauer's News Agency
Rancho Murieta	Software Plus
Sacramento	Deibert's Readerama
	Tower Magazine
San Francisco	Booksmith
	Bookworks
	Castro Kiosk
Santa Monica	Midnight Special Bookstore
San Jose	Computer Literacy Bookshops
Santa Rosa	Sawyer's News, Inc.
Stockton	Harding Way News
	Paperbacks Unlimited
Sunnyvale	Computer Literacy
Torrance	El Camino College Bookstore

COLORADO

Aurora	Aurora Newsstand
Colorado Springs	Hathaway's
Denver	News Gallery
Glenwood Springs	The Book Train
Grand Junction	Readmore Book & Magazine
Longmont	City Newsstand

DELAWARE

Middletown	Delmar Co.
Newark	Newark Newsstand
Wilmington	Normar, Inc.—The Smoke Shop

DISTRICT OF COLUMBIA

Washington, DC	Chronichles
	News Room
	World News, Inc.

FLORIDA

Boca Raton	Great American Book Co.
Clearwater	The Avid Reader
Cocoa	The Open Door
Dania	Dania News & Books
Davie	Software Plus More
Ft. Lauderdale	Bob's News & Book-Store
	Clarks Out of Town News
	Mike's Electronics Distributor
Gainesville	Paper Chase
Jacksonville	Book Co.
North Miami Beach	Almar Bookstore
Panama City	Boyd-Ebert Corp.
Pensacola	Anderson News Co.
Pinellas Park	Wolf's Newsstand
South Pasadena	Poling Place Bookstore
Starke	Record Junction, Inc.
	Radio Shack Dealer
Sunrise	Sunny's at Sunset
Tallahassee	Anderson News Co.
	DuBey's News Center
Titusville	Computrac

GEORGIA

Atlanta	Border's
Bremen	Bremen Electronics/Radio Shack
Forest Park	Ellers News Center
Jesup	Radio Shack
Thomasville	Smokehouse Newsstand
Toccoa	Martin Music Radio Shack

IDAHO

Boise	Book Shelf, Inc.
Moscow	Johnson News Agency

ILLINOIS

Belleville	Software or Systems
Champaign	Bookmark
Chicago	B. Dalton Booksellers
Decatur	Book Emporium
	K-Mart Plaza
	Northgate Mall
East Moline	Book Emporium
Evanston	Norris Center Bookstore
Kewanee	Book Emporium
Lisle	Book Nook
Lombard	Empire Periodicals
Newton	Bill's TV Radio Shack
Paris	Book Emporium
Peoria	Book Emporium
	Sheridan Village
	Westlake Shopping Center
	Illinois News Service
Springfield	Book Emporium
	Sangamon Center North
	Town & Country Shopping Ctr.
Sunnyland	Book Emporium
West Frankfort	Paper Place
Wheeling	North Shore Distributors

INDIANA

Angola	D & D Electronics
	Radio Shack
Berne	White Cottage Electronics
Bloomington	Book Corner
Columbus	Micro Computer Systems, Inc.
Crawfordsville	Koch's Books
Dyer	Miles Books
Franklin	Gallery Book Shop
Ft. Wayne	Michiana News Service
Garrett	Finn News Agency, Inc.
Indianapolis	Bookland, Inc.
	Borders Bookshop
	Delmar News
	Indiana News
	Southside News
Lebanon	Gallery Book Shop
Martinsville	Radio Shack
Richmond	Voyles News Agency, Inc.
Wabash	Mitting's Electronics

IOWA

Davenport	Interstate Book Store
Des Moines	Thackery's Books, Inc.
Fairfield	Kramers Books & Gifts

KANSAS

Hutchinson	Crossroads, Inc.
Topeka	Palmer News, Inc.
	Town Crier of Topeka, Inc.
Wellington	Dandy's/Radio Shack Dealer
Wichita	Lloyd's Radio

KENTUCKY

Hazard	Daniel Boone Gulf Mart
Henderson	Matt's News & Gifts
Hopkinsville	Hobby Shop
Louisville	Hawley-Cooke Booksellers (2 Locations)
Middletown	Software City
Paducah	Radio Shack

LOUISIANA

Baton Rouge	City News Stand
Lockport	TV Doctor/Radio Shack
New Orleans	Sidney's News Stand Uptown
Monroe	The Book Rack

MAINE

Bangor	Magazines, Inc.
Brockton	Voyager Bookstore
Caribou	Radio Shack
Oxford	Books-N-Things
Sanford	Radio Shack

MARYLAND

College Park	University Bookstore

MASSACHUSETTS

Boston	Eastern Newsstand
Brockton	Voyager Bookstore
Cambridge	Out Of Town News
Ipswich	Ipswich News
Littleton	Computer Plus

MASSACHUSETTS (cont'd)

Lynn	North Shore News Co.
Swansea	Newsbreak, Inc.

MICHIGAN

Allen Park	Book Nook, Inc.
Birmingham	Border's Book Shop
Durand	Robbins Electronics
E. Detroit	Merit Book Center
Harrison	Harrison Radio Shack
Hillsdale	Electronics Express/Radio Shack
Holland	Fris News Company
Kalamazoo	The Book Raft
Lowell	Lowell Electronics
Muskegon	The Eight Bit Corner
Niles	Michiana News Service
Perry	Perry Computers
Riverview	Riverview Book Store
Roseville	New Horizons Book Shop

MINNESOTA

Burnsville	Shinder's Burnsville
Crystal	Shinder's Crystal Gallery
Edina	Shinder's Leisure Lane
Minneapolis	Shinder's (2 Locations)
Minnetonka	Shinder's Ridge Square
Roseville	Shinder's Roseville
St. Paul	Shinder's Annex
	Shinder's Maplewood
	Shinder's St. Pauls
Willmar	The Photo Shop

MISSOURI

Farmington	Ray's TV & Radio Shack
Flat River	Ray's TV & Radio Shack
Florissant	Book Brokers Unlimited
Jefferson City	Cowley Distributing
Kirksville	T&R Electronics
St. Louis	Book Emporium
St. Robert	Bailey's TV & Radio

MONTANA

Butte	Plaza Books

NEBRASKA

Lincoln	Nebraska Bookstore
Omaha	Nelson News

NEVADA

Carson City	Bookcellar
Las Vegas	Hurley Electronics
	Steve's Books & Magazines

NEW HAMPSHIRE

Keene	Radio Shack Associate Store
Manchester	Bookwrights
West Lebanon	Verham News Corp.

NEW JERSEY

Atlantic City	Atlantic City News Agency
Cedar Knolls	Village Computer & Software
Clinton	Micro World II
Pennsville	Dave's Elect. Radio Shack
Rockaway	Software Station

NEW MEXICO

Alamogordo	New Horizons Computer Systems
Albuquerque	Page One Newsstand
Santa Fe	Downtown Subscription

NEW YORK

Amherst	Village Green-Buffalo Books
Brockport	Lift Bridge Book Shop, Inc.
Brooklyn	Cromland, Inc.
Elmira Heights	Southern Tier News Co., Inc.
Fredonia	On Line: Computer Access Center
Hudson Falls	G.A. West & Co.
Huntington	Oscar's Bookshop
Johnson City	Unicorn Electronics
New York	Barnes & Noble—Sales Annex
	Coliseum Books
	Eastern Newsstand
	Grand Central Station, Track 37
	200 Park Ave., (Pan Am #1)
	55 Water Street
	World Trade Center #2
	First Stop News
	Idle Hours Bookstore
	International Smoke Shop
	Jonil Smoke
	Penn Book
	Software City
	State News
	Walden Books
	World Wide Media Services
Pawling	Universal Computer Service
Rochester	Village Green
	World Wide News
Woodhaven	Spectrum Projects

NORTH CAROLINA

Cary	News Center in Cary Village
Chapel Hill	University News & Sundry
Charlotte	Newsstand Int'l
Hickory	C^2 Books & Comics
Jacksonville	Michele's, Inc.
Kernersville	K & S Newsstand
Marion	Boomers Rhythm Center
Winston-Salem	K & S Newsstand (3 Locations)
	Rainbow News Ltd.

OHIO

Akron	Churchill News & Tobacco
Canton	Little Professor Book Center
Chardon	Thrasher Radio & TV
Cincinnati	Cinsoft
Cleveland	Erieview News
Columbiana	Fidelity Sound & Electronics
Columbus	B5 Software
	Micro Center
	The Newsstand
Dayton	Books & Co.
	Huber Heights Book & Card
	Wilke News
	Wright News & Books
Dublin	Book Barn
Fairborn	News-Readers
	Wilke's University Shoppe
Findley	Open Book
Kent	The News Shop
Lakewood	Lakewood International News
Lima	Edu-Caterers
Miamisburg	Wilke News
Parma	Bookmark Newscenter
Toledo	Leo's Book & Wine Shop
Warren	Book Nook, Inc.
Xenia	Fine Print Books
Youngstown	Plaza Book & Smoke Shop

OKLAHOMA

Oklahoma City	Merit Micro Software
Taklequah	Thomas Sales, Inc. dba Radio Shack
Tulsa	Steve's Book Store

OREGON

Eugene	Libra Books — Book Mark
Portland	Fifth Avenue News
	Rich Cigar Store, Inc.
	Sixth & Washington News
Salem	Capitol News Center
	Checkmate Book

PENNSYLVANIA

Allentown	Owl Services
Altoona	Newborn Enterprises
Bryn Mawr	Bryn Mawr News
Corry	Corry Books & Cards
Danville	McIndoe's Stationery & Radio Shack
Feasterville	Global Books
King of Prussia	Gene's Books
Malvern	Personal Software
Reading	Smith's News & Card Center
Temple	Software Corner
West Chester	Chester County Book Co.
Wind Gap	Micro World
York	The Computer Center of York
	Tollgate Bookstore

RHODE ISLAND

Newport	Bellevue News

SOUTH CAROLINA

Charleston Hts.	Software Haus, Inc.
Clemson	Clemson Newsstand
Florence	Ray's #1
Greenville	Palmetto News Co.
Spartanburg	Software City

TENNESSEE

Brentwood	Bookworld #5
Chattanooga	Anderson News Co.
	Guild Books & Periodicals
Dickson	Highland Electronics
Knoxville	Anderson News Co.
	Davis-Kidd Bookseller
Memphis	Computer Center
Nashville	Davis-Kidd Booksellers
	Mosko's Place
	R.M. Mills Bookstore
Smyrna	Delker Electronics

TEXAS

Big Spring	Poncho's News
Desoto	Maxwell Books
Elgin	The Homing Pigeon
Harlington	Book Mark

UTAH

Provo	Valley Book Center

VIRGINIA

Danville	K & S Newsstand
Hampton	Benders
Norfolk	I-O Computers
	Turn The Page
Richmond	Volume I Bookstore

WASHINGTON

Port Angeles	Port Book & News
Seattle	Adams News Co., Inc.
	Bulldog News
Tacoma	B & I Magazines & Books
	Nybbles 'N Bytes

WEST VIRGINIA

Huntington	Nick's News
Logan	Stan's Electronics & Radio Shack
Madison	Communications, LTD
Parkersburg	Valley News Service
South Charleston	Spring Hill News

WISCONSIN

Appleton	Badger Periodicals
Cudahy	Cudahy News & Hobby
Kenosha	R.K. News, Inc.
Madison	Pic A Book
	University Bookstore
Milwaukee	Juneau Village Reader
Waukesha	Holt Variety

ARGENTINA

Cordoba	Information Telecommunicationes

AUSTRALIA

Blaxland	Blaxland Computers
Kingsford	Paris Radio Electronics

CANADA:
ALBERTA

Banff	Banff Radio Shack
Bonnyville	Paul Tercier
Brooks	Double "D" A.S.C. Radio Shack
Calgary	Billy's News
Claresholm	Radio Shack Associated Stores
Drayton Valley	Langard Electronics
Edmonton	CMD Micro
Edson	Radio Shack, asd
Fairview	D.N.R. Furniture & TV
Fox Creek	Fox City Color & Sound A.S.C. Radio Shack
Ft. Saskatchewan	Ft. Mall Radio Shack, ASC
Grande Cache	The Stereo Hut
Grande Centre	The Book Nook
Hinton	Jim Cooper
Innisfail	L & S Stereo
Lecombe	Brian's Electronics
Leduc	Radio Shack Associated Stores
Lethbridge	Datatron
Lloydminster	Lloyd Radio Shack
Okotoks	Okotoks Radio Shack
Peace River	Radio Shack Associated Stores
	Tavener Software
St. Paul	Walter's Electronics
Stettler	Stettler Radio Shack
Strathmore	Wheatland Electronics
Taber	Pynewood Sight & Sound
Westlock	Westlock Stereo
Wetaskiwin	Radio Shack

BRITISH COLUMBIA

Burnaby	Compulit
Burns Lake	VT. Video Works
Campbell River	TRS Electronics
Chilliwack	Charles Parker
Coquitlam	Cody Books LTD

BRITISH COLUMBIA (cont'd)

Coortenay	Rick's Music & Stereo
Dawson Creek	Bell Radio & TV
Golden	Taks Home Furnishings
Kelowna	Telesoft Marketing
Langley	Langley Radio Shack
Nelson	Oliver's Books
New Westminster	Cody Books LTD
Parksville	Parksville TV
Penticton	D.J.'s
	Four Corner Grocery
Sidney	Sidney Electronics
Smithers	Wall's Home Furniture
Squamish	Kotyk Electronics
Vancouver	Active Components
	Friendlyware Computers
	Granville Book Co.
	Siliconnections Books LTD
100 Mile House	Tip Top Radio & TV

MANITOBA

Altona	L.A. Wiebr Ltd.
Lundar	Goranson Elec.
Morden	Central Sound
The Pas	Jodi's Sight & Sound
Selkirk	G.L. Enns Elec.
Virden	Archer Enterprises
Winnipeg	J & J Electronics Ltd.

NEW BRUNSWICK

Moncton	Jeffries Enterprises
Sussex	Dewitt Elec.

NEWFOUNDLAND

Botwood	Seaport Elec.
Carbonear	Slade Realties

NOVA SCOTIA

Halifax	Atlantic News

ONTARIO

Angus	Micro Computer Services
Aurora	Compu Vision
Concord	Ingram Software
Exceter	J. Macleane & Sons
Hanover	Modern Appliance Centre
Huntsville	Huntsville Elec.
Kenora	Donny "B"
Kingston	T.M. Computers
Listowel	Modern Appliance Centre
South River	Max TV
	Dennis TV
Toronto	Gordon and Gotch

QUEBEC

LaSalle	Messageries de Presse Benjamin Enr.
Pont. Rouge	Boutique Bruno Laroche
Ville St. Gabriel	Gilles Comeau Enr/Radio Shack

SASKATCHEWAN

Assiniboia	Telstar News
Estevan	Kotyk Electronics
Moose Jaw	D&S Computer Place
Nipiwan	Cornerstone Sound
Regina	Regina CoCo Club
	Software Supermarket
Saskatoon	Everybody's Software Library
Shellbrooke	Gec. Laberge Radio Shack
Tisdale	Paul's Service
Unity	Grant's House of Sound

YUKON

Whitehorse	H & O Holdings

JAPAN

Tokyo	America Ado, Inc.

PUERTO RICO

San Juan	Software City

Also available at all B. Dalton Booksellers, and selected Coles and W.H. Smith in Canada, Waldenbooks, Pickwick Books, Encore Books, Barnes & Noble, Little Professors, Tower Book & Records, Kroch's & Brentano's, and Community Newscenters.

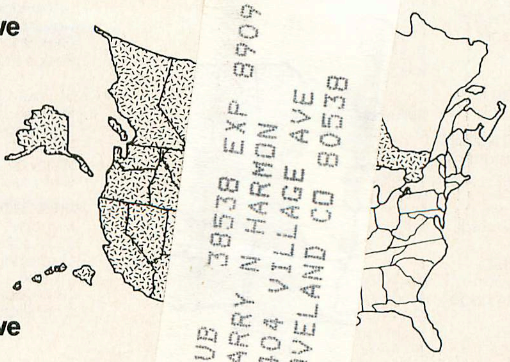
Advertisers Index

We encourage you to patronize our advertisers — all of whom support the Tandy Color Computer. We will appreciate your mentioning* THE RAINBOW *when you contact these firms.

4-TECHS 65
Adventure Novel Software 67
After-Five Software 125
Alpha Products 21
Alpha Software Technologies 133
Alpha-Biotechnologies Inc. 139
Baron Products 91
Bob's Software................75
Burke & Burke.............20, 139
Cer-Comp..................38, 39
Cinsoft 78
CoCo Connection..............77
CoCo Gallery Live 117
CocoTech 45
Codis Enterprises 113
Cognitec 29
Colorware.................18, 19
Computer Center 61
Computer Island 131
Computer Plus 3
CRC/Disto....................57
CY-BURNET—ICS 55
D.P. Johnson 151
DATAMATCH, INC. 135
Dayton Associates of W. R. Hall, Inc. 114, 115
Diecom ....IFC
Dr. Preble's Programs.........IBC
E-Z Friendly Software 145
Easy Street Data Systems 149
Eversoft, Inc. 79
FoxWare 101
Frank Hogg Laboratory 46, 47
Game Point Software...........81
Gimmesoft 22, 23
Granite Computer Systems 37
GSW Software 113
Hard Drive Specialist 73
Hawkes Research Services 121
HawkSoft, Inc. 129
HJL Products 43
Howard Medical 66, 162
J & R Electronics..............45
Metric Industries 12
Michtron.....................BC
Micro Works, The 85
Microcom Software 9, 11, 13, 15, 17
Microtech Consultants Inc. 109
MicroWorld 99
Orion Technologies 31
Owl-Ware 69, 70, 71
Perry Computers.............153
PXE Computing 7
R.C. Pierce Software 31
Rainbow Bookshelf 34, 35
Rainbow Gift Subscription.....127
Rainbowfest.............118, 119
Rainbow on Tape and Disk 126
Rulaford Research 124
SD Enterprises ...25, 75, 77, 79, 81
Second City Software 161
Soft-Byte 55
SpectroSystems 135
SPORTSWARE 101
St. John Gallery 133
Sugar Software 97
Sundog Systems 63
T & D Software........49, 122, 123
Tandy/Radio Shack 33
Tepco 141
Three C's Projects 65
Tomela & Co.................121
True Data Products.......136, 137
Vidicom Corporation 145
Wasatchware 129
Woodstown Electronics 78
Zebra Systems 53

▨ **Call:**
Belinda Kirby
Advertising Representative
The Falsoft Building
9509 U.S. Highway 42
P.O. Box 385
Prospect, KY 40059
(502) 228-4497

☐ **Call:**
Kim Vincent
Advertising Representative
The Falsoft Building
9509 U.S. Highway 42
P.O. Box 385
Prospect, KY 40059
(502) 228-4492



SUB 38538 EXP 8909 RBOW09/88
HARRY N HARMON
1404 VILLAGE AVE
LOVELAND CO 80538

MasterCard VISA C.O.D. CHECKS **ORDER**

Second City Software

P.O. Box 72956
Roselle, IL 60172
Order: 312-653-5610
BBS: 312-307-1519

CoCo CALENDER:
Organize all of your appointments with this 365 day CoCo Calender. 64k DISK $9.95

BLACKJACK ROYALE:
Even your casino odds with this BlackJack card simulation and tutor! Program can be edited for different house rules. 64k DISK........................$16.95

BSE - BASIC SCREEN EDITOR:
Gives Basic a full-screen editor to supplement the regular EDIT commands. Works on the CoCo 1&2 and with the CoCo 3, WIDTH 32, 40 or 80 is supported! Complete screen cursor control with the arrow keys plus features to make EDITing Basic programs a snap! BSE, a must have CoCo utility. Our low price was the only corner that was cut on this quality program. 64k DISK..$19.95

CHECK-09:
Finally, a program that interacts with MultiVue for FAST and EASY check balancing. CHECK-09 and you can now take control of your bank checking account. No more waiting on your bank statement for an ending balance. CHECK-09 will provide a check-by-check balance in an easy to use format that eliminates those monthly surprizes! Bring your money and you closer together and have the buck STOP HERE! 512k DISK........................$22.95

CoCoMAX II: By Colorware
The 'CLASSIC' CoCo graphic program. Draw great works of art with the program that set a standard for all others to follow. Supported by a Hi-Res interface and numerous printer drivers for complete configuration. 64k DISK...........$78.45

CoCoMAX III: By Colorware
All new program based off the 'CLASSIC' CoCoMax II software. Allows for full animation, select 16 colors from a 64 color palette, fast & easy to use w/pull down menus in a point-and-click environment. 128k or 512k DISK................$78.45

CoCo KEYBOARD:
Program allows the user to utilize the function keys on the HJL-57 Professional, Deluxe CoCo, and Micronix keyboard. 32k DISK....................$6.95

MULTI-PAK CRACK:
Allows you to save your ROM-PAK programs over to disk...WHERE THEY BELONG! Includes POKES for problem PAKs and the new 16k PAKs. 64k DISK................$24.95

TELEPATCH:
Turn Telewriter 64 into the best Word Processor for the CoCo 1&2! TELEPATCH is compatible with all CoCo's. Comes with complete documentations for easy upgrading and changes. 64k DISK $24.95

HI-RES FONT MODIFIER...........$14.95
COLOR MAX III FONT EDITOR......$19.95
SOFTWARE SPOOLER & RAM DISK....$19.95

SCHEMATIC DRAFTING PROCESSOR:
A 'FAST' and 'EASY TO USE' ELECTRONIC DRAFTING PROCESSOR. Create pro-looking diagrams using a 480x540 pixel screen with 6 viewing windows! Over '30' electronic symbols with 10 definable symbols. Even supports Logic gates & Multipin chips! Print hardcopy or save to disk for later editing. 64k DISK......................$22.95

OS-9 SOLUTION:
Tame the hostile environment of OS-9 with OS-9 SOLUTION! Replaces 20 of the command calls with single keystroke, menu driven commands. No more long and complex pathnames or syntaxes to remember! Works with either OS-9 Level One or Two.....................$24.95

TAPE/DISK UTILITY:
A utility package that transfers TAPE to DISK or DISK to TAPE automatically. If you just got your first disk drive, TAPE/DISK is a MUST HAVE program. Will print tape & disk directories to any supported printer. 64k DISK....$19.95

FAST DUPE 2:
Backup & Format as many copies of your original disk that you need. FAST DUPE 2 reads source into memory for fast and realible transfer. Supports 4 disk drives. 64k DISK...............$19.95

DISCOUNT SOFTWARE BY ColorVenture
RAM DISK LIGHTNING DISK........$16.95
PRINTER LIGHTNING.............$16.95
BACKUP LIGHTNING..............$16.95
BUY ALL THREE FOR ONLY..........$42.95

HI-RES JOYSTICK DRIVER.........$19.95
MAX PATCH......................$19.95
BUY BOTH FOR ONLY..............$34.95

SECOND CITY SOFTWARE
ACCEPTS MASTER CARD, VISA, C.O.D. AND CHECK ORDERS. PLEASE ADD $2.50 FOR SHIPPING ($4.50 for Canada orders) & ALLOW 1 TO 3 WEEKS FOR DELIVERY. C.O.D. ORDERS, ADD AN ADDITIONAL $2.00.

MY DOS: By Chris Hawks
Supports accesses to double sided drives, able to use the J&M Controller with the CoCo 3, DIR commands simplified and a host of other special features. 64k DISK......................$14.95

SCS DOS:
Add 24 new disk commands with 2 Hi-Res Screens! Supports 40 track & Double Sided drives, 6ms stepping, auto disk search, error trapping and burnable into an EPROM. 64k DISK...............$24.95

A-DOS 3:
The very popular Disk Operating System from SpectroSystems for the CoCo 3. 128k DISK......................$34.95
SCS can custom 'burn' your purchased DOS program for only $15.00! This includes the price of the EPROM chip and the BURN charge. Call or write for details.

VIP LIBRARY:
This popular 'intergraded' package includes, VIP Writer, Terminal, Data Base, Calc and Disk Zap which can fix a diskette with I/O errors. SCS special price. 64k DISK................$125.00

VIP WRITER III w/SPELL CHECKER...$79.95
VIP DATABASE III.................$69.95

TELEWRITER - 128................$76.95

THE NEWSPAPER PLUS:
DeskTop Publishing for the CoCo 3? With the ALL NEW NEWSPAPER PLUS, you now can create complete and sophisticated Banners, Headlines along with Text Columns and Graphics. THE NEWSPAPER PLUS allows for importing different pictures, fonts and fill patterns from disk for that prolook. Comes complete with 22 fonts and 50 clip art pictures. THE NEWSPAPER PLUS is an all new upgraded program based on the original NEWSPAPER program. SCS is the ONLY company authorized to handle THE NEWSPAPER PLUS program. Why buy the old, overpriced and outdated program when you can get the newest release for less! 128k DISK.................$48.95

THE NEWSPAPER GRAPHICS DISK I:
The FIRST OFFICIAL supplementary program disk for THE NEWSPAPER. Contains '50' NEW PICTURE FILES, '10' NEW FILL PATTERNS and '3' ADDITIONAL FONT SETS! GRAPHICS DISK I is available only from Second City Software for $19.95

HOWARD MEDICAL COMPUTERS

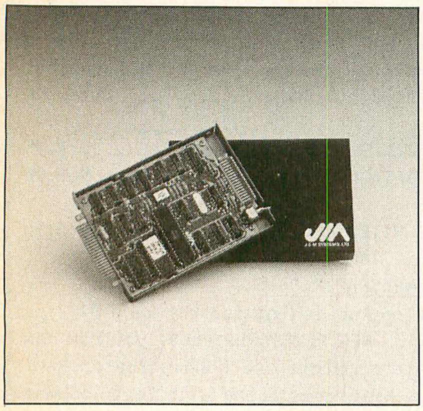
1690 N. Elston • Chicago, IL 60622 • ORDERS (800) 443-1444 • INQUIRIES AND ORDER STATUS (312) 278-1440

★ 5 STAR FINAL | OCTOBER '88 | CLEAR

HD-1 Sale Extended

DC-5 CONTROLLER

from Hard Drive Specialist gives great Radio Shack compatability and double sided access to DSDD Drives like Howard's DD-3. Two ROM sockets, one 24 pin and one 28 pin allows use of RS 1.1 ROM by jumper selection. Gold plated contacts reduce I/O Errors.
$75 ($2 Shipping)



RS DOS ROM CHIP

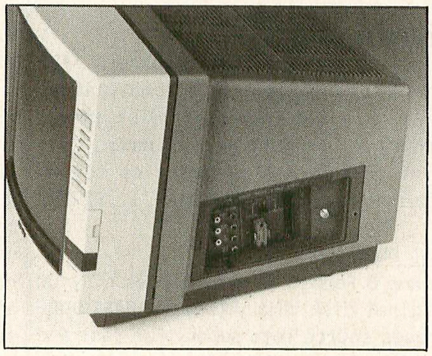
ROM chip fits inside disk controller. 24 pin fits both J&M and RS controller Release 1.1. For CoCo 3 Compatibility. $25 each Reg. $40 ($2 shipping)

NEW FROM DISTO $129 DC6 ($2 Shipping) Super Controller II works with CoCo 1, 2 & 3. It buffers keyboard input so that no keystrokes are lost when disk is reading or writing. Especially useful with OS-9, but also works with BASIC.

MONITOR

Sony KV-1311CR $499
Regular $625 ($15 shipping)

• Vivid Color • Vertically flat 13″ screen • Monitor/Trinitron TV with remote control • 640 × 240 resolution at 15MHZ .37 mm Dot pitch • RGB analog & digital; TTL; and composite inputs • VCR inputs • Cable to CoCo 3 $36

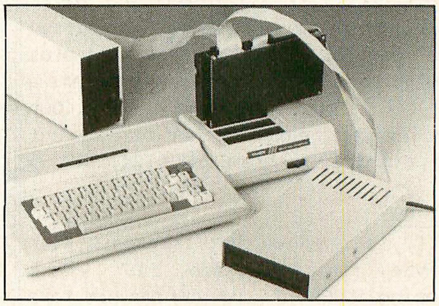


HARD DRIVE ACCESSORIES

3′ Hard Drive Cable $20
Clock Upgrade $20
Burke & Burke $78.45
Y Cable $29.45
TEAC 55B $118
Hard Drive ROM Boot $20

"Guarantee" As good as Gold.

Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back (less shipping.) Shipping charges are for 48 states. APO, Canada and Puerto Rico orders are higher.



Hard Drive–Ready to Run!

20,000,000 Bytes or the equivalent to a 125 R.S. 501's on line are packed into this hard drive, pre installed and ready to run. All you need to do is plug it in and go! This complete easy to use package includes a Seagate 20 Meg Hard Drive, a Western Digital WD 1002-WX 1 Controller and interface* that plugs into slot #3 of multipack interface, plus the case & power supply. You even get a 1 year warranty. This 20 meg Hard Drive will work with IBM & clone. Basic driver, $49.95, lets you access this hard drive without need for OS-9.

HD-1 **$499**
*** Burke & Burke** ($9 Shipping)

Sale ends Nov. 15

RAINBOWfest Surprise!

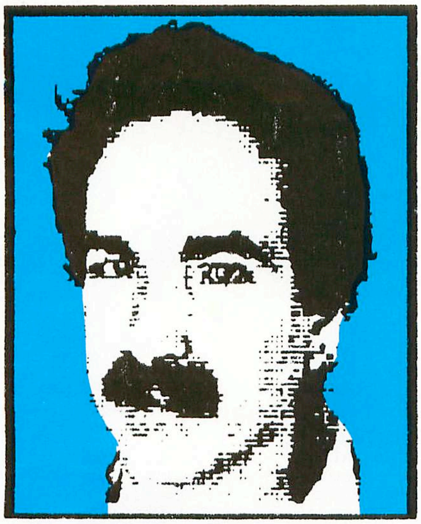
We can't mention this till the fest except to say its the most unique product for the CoCo we have seen. See us at booths 3 & 4.

DON'T MISS OUT, ORDER TODAY!
800 / 443-1444

WE ACCEPT VISA • MASTERCARD
• AMERICAN EXPRESS • C.O.D. OR
CHECKS • SCHOOL P.O.
NEW — DISCOVER CARD

Dr. Preble's Programs

For Color Computer Software
Since 1983



Dear Friends,

Thank you. 1988 marks our fifth year of providing quality software for the Color computer. Only your support has made it possible. So, from our hearts, Peg and I thank you. And remember our promise--If you buy it from us, we support it. If you are unhappy for any reason, send it back for a full refund within 30 days of purchase.

Pyramix

This facinating CoCo 3 game continues to be one of our best sellers. Pyramix is 100% machine language written exclusively to take advantage of all the power in your 128K CoCo 3. The Colors are brilliant, the graphics sharp, the action fast. Written by Jordon Tsvetkoff and a product of Color-Venture.

The Freedom Series

Vocal Freedom

I've got to admit, this is one nifty computer program. Vocal Freedom turns your computer into a digital voice or sound recorder. The optional **Hacker's Pac** lets you incorporate voices or sounds that you record into your own BASIC or ML programs. This is not a synthesizer. Sounds are digitized directly into computer memory so that voices or sound effects sound very natural. One "off-the-shelf" application for Vocal Freedom is an automatic message-minder. Record a message for your family into memory. Set Vocal Freedom on automatic. When Vocal Freedom "hears" any noise in the room, it plays the pre-recorded message! Disk operations are supported. VF also tests memory to take advantage of from 64K up to a full 512K. Requires low cost amplifiler (RS cat. #277-1008) and any microphone.

Mental Freedom

Would your friends be impressed if your computer could read their minds? Mental Freedom uses the techniques of Biofeedback to control video game action on the screen. Telekinesis? Yes, you control the action with your thoughts and emotions. And, oh yes, it talks in a perfectly natural voice without using a speech synthesizer! Requires Radio Shack's low cost Biofeedback monitor, Cat. #63-675.

BASIC Freedom

Do you ever type in BASIC programs--manually, I mean. If you do, you know it can be a real chore. Basic Freedom changes all that. It gives you a full screen editor just like a word processor, but for BASIC programs. Once loaded in, it is always on-line. It hides invisibly until you call it forth with a single keypress! This program is a must for programers or anyone who types in programs. By Chris Babcock and a product of Color-Venture.

Lightning Series

These three utilities give real power to your CoCo 3.

Ramdisk Lightning

This is the best Ramdisk available. It lets you have up to 4 mechanical disk drives and 2 Ram drives on-line and is fully compatible with our printer spooler below.

Printer Lightning

Load it and forget it--except for the versatility it gives you. Never wait for your printer again! Printer runs at high speed while you continue to work at the keyboard!

Backup Lightning

This utility requires 512K. Reads your master disk once and then makes superfast multiple disk backups on all your dirves! No need to format blank disks first! Supports 35, 40 or 80 track drives.

Prices

CoCo 3 only

Ram Disk Lightning, Disk	$19.95
Printer Lightning Disk	$19.95
Backup Lightning, Disk	$19.95
All three, Disk	$49.95
Pyramix, Disk	$24.95

CoCo 1,2, or 3

Vocal Freedom, Disk	$34.95
Vocal Freedom Hackers Pac	$14.95

CoCo 2 or 3 only

Mental Freedom, Disk	$24.95
Basic Freedom, Disk	$24.95

CoCo 1 or 2 only

VDOS, The Undisk, ramdisk for the CoCo 1 or 2 only, Tape	$24.95
VDUMP, backup Undisk files to single tape file, Tape	$14.95
VPRINT, Print Undisk directory, Tape	$9.95

Everyone

Add $2.50 shipping/handling in USA or CANADA

Add $5.00 to ship to other countries

Dr. Preble's Programs
6540 Outer Loop
Louisville, KY 40228

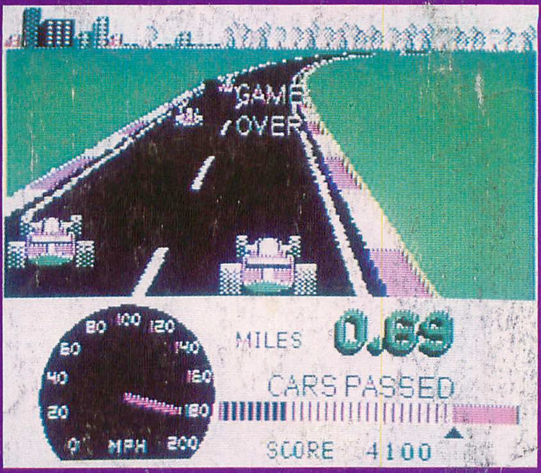
24 Hour Hot Line
(502) 969-1818

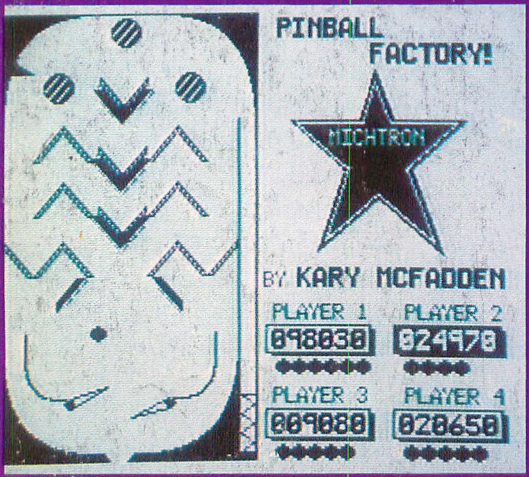
Visa, MC, COD, Check

Speed Racer

As the checkered flag drops your pulse rises in this lively arcade game. The road twists to the horizon on the 3-D panorama that sets the stage for exciting racing. Vie for time as you glide through the curves at incredible speeds. Step through the gears to stay ahead of the pack, but be quick! Some will stop at nothing to see the end of the race, or the end of you! Four challenging raceways, complete with obstacles and colorful 3-D scenery test your skills in this Pole Position™ type game.

32K Color Computer required…$34.95





Pinball Factory

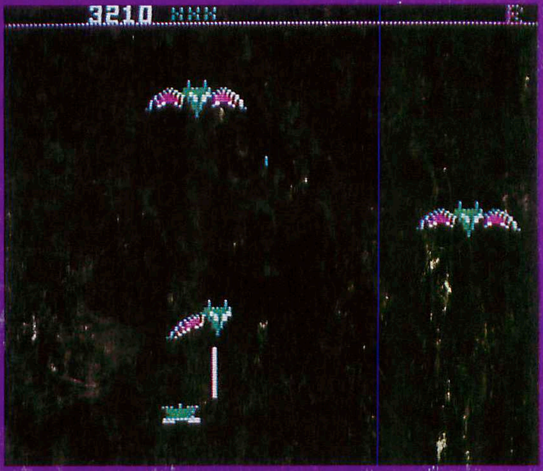
Video games come full circle in this tribute to the original arcade game, *Pinball*. Classic pinball springs to life as never before, with fresh new angles that only a computer can offer. Crisp graphics, sound, and fast smooth action give this machine-language arcade game a realistic, responsive feel you'll hardly believe. There are even "tilt" buttons that let you "bump" the machine. In addition to playing a great game of pinball, you can enjoy hours of creative pleasure as you design, build, edit, and play your own screens.

64K Color Computer required…$34.95

Demon Seed

The first waves of flying, diving, bloodthirsty bats are arriving. Move, fire, and move again. It's a never ending battle. If you are lucky enough to defeat the bats, be ready for a much greater challenge, The *Evil Demons* themselves. Destroy a wing and another takes its place. Only a direct hit can save you now. It will take great skill to triumph. If you do, then you better be ready for the *End*. The Demon Flag Ship descends to destroy your remaining ships. Your only hope is to penetrate the hull, break through the shield, and destroy the dreaded Gargoyle.

32K Color Computer required…$19.95



MichTron is always looking for programmers and programs. If you are interested in working with one of the most respected company's in the computer software field please give us a call.

MichTron®

For more information
on these or other fine products
call our knowledgeable staff!

576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700

Dealer inquiries welcome.
Visa and Mastercard accepted.